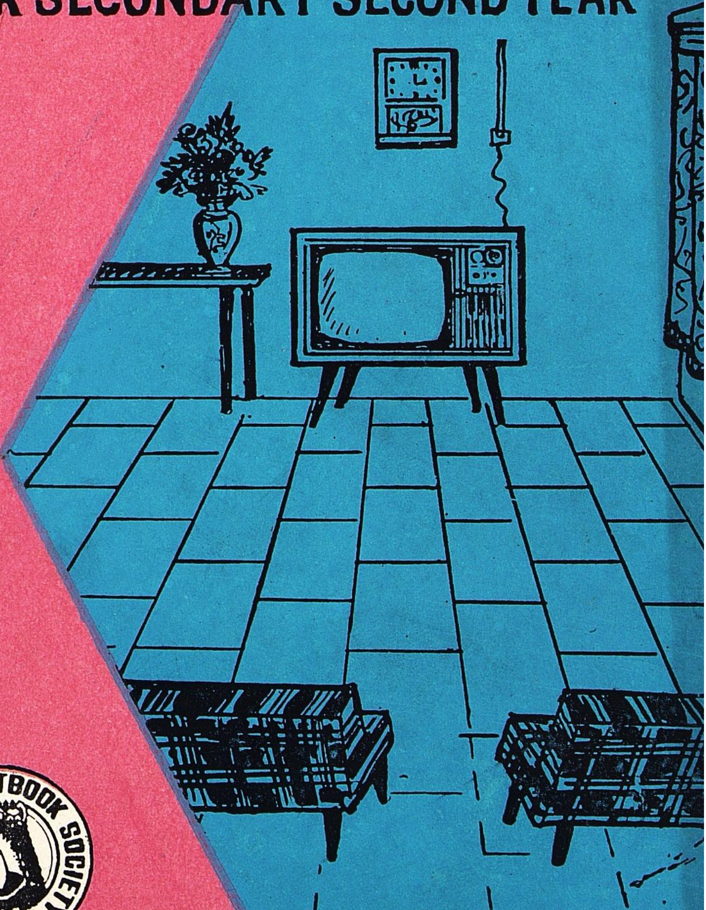
HOME SCIENCE

HIGHER SECONDARY SECOND YEAR



TAMILNADU TEXTBOOK SOCIETY

HOME SCIENCE

HIGHER SECONDARY—SECOND YEAR

1. **Untouchability is a sin.**
2. **Untouchability is a crime.**
3. **Untouchability is inhuman.**

Tamil Nadu Textbook Society
MADRAS

First Edition—1979

Revised Edition—1982

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Price : Rs. 3-90

This book has been printed on concessional paper of 60 G.S.M. substance made available by the Government of India.

Printed at :
BHAGAT PRINTERS, MADRAS-600 016.

CONTENTS

CHAPTER I

HUMAN PHYSIOLOGY

1. DIGESTIVE SYSTEM

The alimentary canal

The alimentary canal is a long muscular tube consisting of the following parts from above downwards—the mouth (guarded by lips and teeth), tongue, pharynx, oesophagus, stomach, small intestine, large intestine, rectum and anal canal. The ducts of the salivary glands open into the month. The proximal end of the stomach is guarded by the cardiac sphincter. The distal end of the stomach is guarded by the pyloric sphincter. Small intestine begins after the pyloric sphincter and consists of duodenum, jejunum and ileum. Duodenum receives food from the stomach. The bile duct and pancreatic duct jointly open in it through ampula of vater. Small intestine opens into the large intestine. The opening between them is guarded by iliocolic sphincter. Large intestine consists of ascending colon, transverse colon and descending colon. The descending colon opens into the last part—rectum and anal canal. The latter opens outside through the anal orifice. Peritonium is a serous membrane which lines the interior of the abdominal cavity. Mesentry is the continuation of the peritonium and extends to the small and large intestine from dorsal body wall.

Histologically alimentary canal consists of the following four layers from outside inwards—Tunica adventitia or serous coat, the muscular coat, the submucous coat and the mucous coat. There are two autonomic nerve plexuses between the layers—the Meissnus plexus in the submucous coat and Auerboch's plexus in the muscular coat.

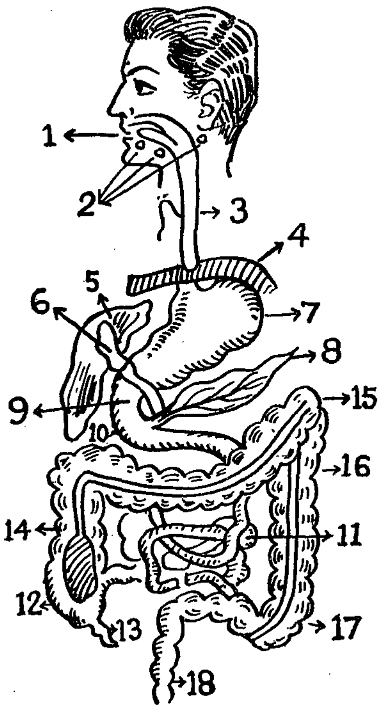
Digestion of food stuffs

Digestion is the process by which the complex form of food materials are broken down into simpler form of food materials

suitable for absorption. This is done with the help of five digestive juices. They are saliva, gastric juice, bile, pancreatic juice and intestinal juice.

Salivary glands and Saliva

Saliva is a juice secreted by three pairs of salivary glands situated in the mouth.



1. Mouth
2. Salivary glands
3. Oesophagus
4. Diaphragm
5. Liver
6. Gall bladder
7. Stomach
8. Pancreas
9. Pylorus
10. Duodenum
11. Small intestine
12. Ceacum
13. Vermiform Appendix
14. Ascending colon
15. Transverse colon
16. Descending colon
17. Rectum
18. Anus

Fig. 1. Digestive System

They are the parotid, submaxillary and sub-lingual glands. These glands consist of cells arranged in the shape of alveoli. The alveoli secretes the juice and it is conveyed by a system of minute ducts which pour the juice into the mouth. Salivary secretion is a reflex process both conditioned and unconditioned reflexes are involved. A new born infant salivates when food is placed in its mouth. But the sight and smell of food does

not produce any reaction. Later by associating the sight and smell of food with its taste, the child learns that the food has certain qualities and these very qualities are afterwards capable of eliciting salivary secretion. The experiments on conditioned reflex were done in the beginning of the century by the Russian physiologist Pavlov. In his experiments he used to sound a gong just before giving food to the dog. After continuing this procedure for some days, it was seen that only the gong sound was sufficient to cause salivation even when no food was given. The gong sound here acts as the conditioned stimulus.

Functions of Saliva

(1) It keeps the mouth moist and helps speech (2) It helps in the process of mastication of the foodstuff and in preparing it into a bolus suitable for deglutition. (3) It dilutes hot, irritant substances and thus prevents injury to the mucous membrane. (4) Saliva contains two enzymes (*a*) ptyaline, which splits starch into maltose (*b*) maltase, which converts maltose into glucose (5) Saliva helps in the sensation of taste. (6) It helps heat loss. This is mainly found in animals when they become hot, more saliva is secreted causing greater heat loss (7) It helps in the excretion of certain substances like drugs containing mercury, lead and iodine.

Stomach and gastric juice

The food material after being broken down by mechanical grinding and having been converted into a bolus with saliva, reaches the stomach. The stomach acts as a pouch for holding large quantities of food so that frequent feeding can be avoided. The stomach mixes up the food thoroughly by its movements. It also destroys the bacteria by the high acidity and it produces the intrinsic factor necessary for the formation of the haematinic principle. But the most important function of the stomach is digestive in nature. It pours out a large quantity of gastric juice everyday. The gastric juice contains mainly hydrochloric acid, mucous and enzymes. The main enzymes present in the gastric juice are pepsin, renin and gastric lipase. The pepsin is contained in an inactive form called pepsinogen and the hydrochloric acid converts it into pepsin. Pepsin is a powerful

proteolytic enzyme and is capable of converting proteins into peptones. Renin is otherwise called thc 'milk-curdling' enzyme as it converts the undigestible protein of milk into the easily digestible form in which it is found in curds. It is of great importance in individuals whose main food is milk as in infants. The gastric lipase is a rather unimportant fat-splitting enzyme of low potency.

The mechanism of production of gastric juice is similar to that of the production of saliva. The first phase called the cephalic phase is a conditioned reflex built on previous experience. The nervous phase which follows is controlled by the sympathetic and parasympathetic portions of the autonomic nervous system. The vagus nerve which is parasympathetic in nature is capable of producing large quantities of gastric juice, rich in hydrochloric acid and enzymes, whereas sympathetic stimulation elicit a thick juice having large quantities of mucin. But the most important mechanism for the continued production of gastric juice is chemical or hormonal in nature. When digested food material is in contact with gastric mucosa, a chemical extract is formed. It is named gastrin and belongs to the group of gastrointestinal hormones. This substance when injected can cause the discharge of large quantities of gastric juice. This action is seen even when the stomach is severed of all its nervous connections. In fact, it can be demonstrated in a denervated transplanted gastric pouch and thus is clearly a chemical mechanism. Gastrin is similar to histamine, a chemical produced during tissue injury or damage.

Bile and its action: Functions of Liver

The liver is one of the largest and most important organ situated on the right side of the abdomen. The liver is a great metabolic factory and carries out a variety of functions. These functions can be classified as follows.

(*a*) **Metabolic functions:** The liver converts glucose into glycogen and helps in its storage whenever there is necessity to do so. It also degrades the glycogen to form glucose. Similarly it also metobolises the aminoacids and forms them into protein groups and undertakes deamination and transamination

to convert one type of food material into another. Fats are also metabolised and converted to other types of material in the liver. In short the liver receives the different types of basic end products of digestion and constitutes the common metabolic pool from which the necessities of body economy are met.

(*b*) **Formation of protein materials :** Liver forms plasma proteins like albumin and fibrinogen. It also forms prothrombin and heparin which are vital for the process of coagulation.

(*c*) **Storage :** The liver stores some essential food materials and is also the store house for iron, and fat soluble vitamins. As a matter of fact, liver is the richest source of these vitamins and hence the efficacy of cod liver oil and shark liver oil as sources of vitamins.

(*d*) Liver helps in the detoxication of some substances.

(*e*) Formation and destruction of blood cells. The reticulo endothelial cells of the liver destroys the old bloodcells.

(*f*) **Formation of bile :** The most important function of liver is the formation of bile. Bile contains bile salts, bile pigments, mucin and water. The bile pigments are yellow coloured substances like bilirubin which is the pigment portion of the destroyed red blood cell. This is an excretory product and gives the yellow colour to the faeces and has no digestive function. In certain diseases either due to excess production of bile pigments or due to liver damage or obstruction of the bile duct bilirubin collects in excess quantities in blood and colours the conjuctiva and the skin. This is called jaundice which is a well-known disease symptom. The bile salts however are essential for digestion. Sodium taurocholate and glycocholate are the salts present in human bile. The bile salts have the property of reducing surface tension and thus render the fats in the food miscible and enable the fat-splitting enzymes of the pancreas and the intestines to act on them. Thus bile is essential for digestion though it does not contain any digestive enzyme. The liver produces large quantities of bile as a continuous process. The bile is taken by the hepatic duct and is stored in the gall bladder which is situated on the lower surface of the liver.

The bile is concentrated in the gall bladder and is sent out occasionally when food enters the duodenum through the cystic duct. This in turn joins the pancreatic duct and it opens as a common channel into the duodenum. In the absence of bile, fats are not digested properly and fatty diarrhoea results. Oils and fats and bile salts themselves act as stimulants for the secretion of bile and are called cholagogues.

Pancreas and pancreatic juice

The food materials are acted upon by bile salts which reduce the surface tension of the fats and enable the fats to be split up into very small molecules. Subsequently it comes into contact with the pancreatic juice. Pancreas is an exocrine as well as an endocrine gland. The main cells are exocrine in nature and pour their secretion by a duct in common with the bileduct into the duodenum. Studded throughout the pancreas are small masses of cells known as islets of Langerhans which produces a hormone called insulin. The pancreatic juice contains three powerful enzymes which act on all the proximate principles of food. Pancreatic amylase is a carbohydrate splitting enzyme of greater power which is capable of splitting carbohydrates upto the last stage of glucose. Trypsin is the pancrea-

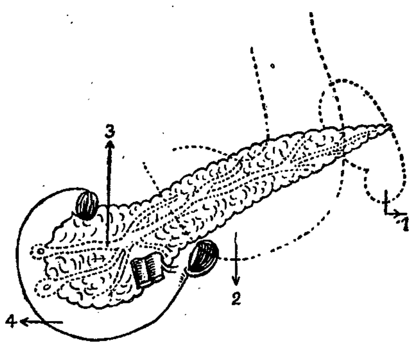


Fig. 2. Pancreas
1. Left kidney 2. Stomach 3. Pancreatic duct 4. Duodenum

tic protease and acts on the peptones and converts them into polypeptides. The pancreatic lipase converts fats into fatty acids and glycerol. Besides these enzymes the pancreatic juice

contains large quantities of Sodium bicarbonate which neutralizes the hydrochloric acid produced by the stomach and provides the medium necessary for the action of enzymes contained in the pancreatic juice.

Succus entericus

After pancreatic digestion, the food which is now called chyme proceeds further in the intestines. Here it comes into contact with succus entericus which is the juice produced by the small intestine. Situated in the intestinal mucous membrane itself are innumerable small short glands which pour their secretion directly into the intestinal tract. The main enzymes of the succus entericus is a proteolytic one called erepsin. At one time it was thought to be a single enzyme acting on the polypeptides. But now it is known that erepsin is an enzyme complex consisting of a large number of specific enzymes acting on individual polypeptides. Thus there is nucleotidase acting on nucleotides and nucleosidase acting on nucleosides besides several other varieties. It also contains three sugar splitting enzymes called lactase, maltase and sucrase converting the respective sugars into the constituent glucose molecules. It also has a lipase, acting on the fats. The succus entericus is the last digestive juice secreted by the small intestine acting on the food and converts food materials into the final end products of digestion.

Absorption of food

The final products of digestion of carbohydrates is glucose while that of proteins are aminoacids. The fats are converted into fatty acids and glycerol. The ultimate units are the only substrats which can be absorbed by the gastro-intestinal tract. However delectable or however crude the type of food we eat, it has necessarily to be converted into these units and to that extent digestive physiology can be considered extremely socialistic in its outlook.

The main portion of the digestive tract where absorption takes place is the small intestine. Practically nothing is absorbed from the stomach and the large intestine except perhaps small

quantities of water and alcohols. The small intestines are thrown into a very large number of folds to increase the area of the surface of absorption. These finger like projections are called *villi*. Each villus consists of the mucous membrane

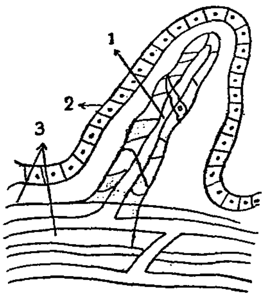


Fig. 3. Interior of Villus
1. Lacteal 2. Epithelium 3. Blood vessels

envelope enclosing a capillary loop and a lymph channel or lacteal. Both glucose and aminoacids are absorbed by a positive pressure gradient between the intestinal contents and the blood as well as by an active process involving enzymatic reactions. The fats enter the lacteals so that these lymph ducts are seen as white and milky in appearance after a meal of fat. The food materials after absorption is taken mostly to the liver for metabolic process.

Movements of the gastro intestinal tract

Deglutition is the process by which the masticated food is transported across the pharynx and reaches the stomach. The stomach makes contractile movements by which the food is well mixed up with gastric juice. After being in the stomach for 3 to 4 hours, the pyloric sphincter opens pushing the food into the duodenum. The intestines shows three important types of movements. They are (*i*) pendular movement (*ii*) segmenting movement and (*iii*) peristaltic movement. In the large intestine there is little digestive activity. The large intestine contains a rich culture of bacteria which helps in the bacterial decomposition of waste materials. Certain substances like

vitamin K and certain other food factors are produced as a result of this activity. The chyme is also deprived of its water by absorption and is converted into almost solid faecal matter.

Exercise

1. Describe the mechanism of gastric secretion.
2. Describe the movements of gastro-intestinal tract.
3. Write about the digestion and absorption of fat, protein and carbohydrate.

2. RESPIRATORY SYSTEM

Oxygen is as important as food materials for the economy of the cells and the carbon dioxide produced as a result of tissue metabolism must be carried away from the site of production. This is done by blood, the arterial blood, bringing in the oxygen

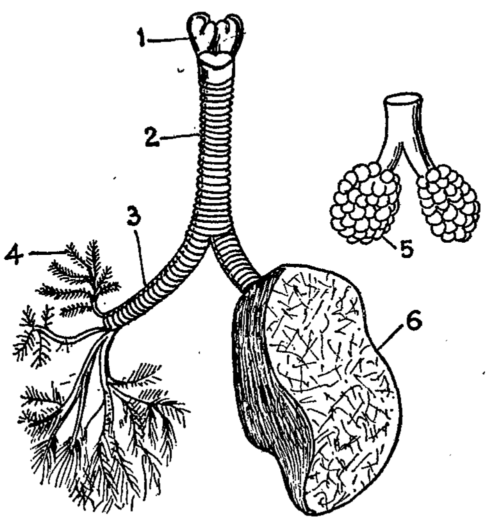


Fig. 4 Lungs

1. Epiglottis 2. Trachea 3. Left lung 4. Alveolus 5. Bronchiole 6. Bronchi

and the venous blood carrying away the carbon dioxide. This is known as internal respiration. For internal respiration to be

effective, blood must constantly be in motion which is performed by the cardio vascular system. However, there has to be a mechanism by which the blood can be cleared of its carbon dioxide content and supplied with oxygen as a continuous process. This important task of external respiration is carried out by the lungs.

Physiological Anatomy of the Lungs

Atmospheric air containing a large percentage of oxygen and very little of carbon dioxide is taken into the lungs and the expired air contains small percentage of oxygen and a higher percentage of carbon dioxide. The air enters the repiratory system through the nose. It is of course, possible to breathe through the mouth. But this is injurious due to more reasons than one. There are hairs inside the nostrils to remove dust and the air can also be heated up by the air pockets in the nasal bones. Moreover mouth breathing dries up the mucuous membrane of the mouth and interferes with taking of food and digestion.

The air enters the nasopharynx which is continuous with the rest of the pharyngeal cavity. From the pharynx air passes through the trachea which is a tube kept constantly patent by a large number of cartilagenous rings. The larynx or the voice box is at the top of the trachea and it is the vocal cords inside the box which by its coming together and going away from one another produces different sounds. The trachea divides into two to go to the two lungs. The branch of the trachea called the bronchus becomes split up into smaller and smaller bronchi ultimately becoming the respiratory bronchioles. This ends in a set of epithelial bags resembling a bunch of grapes. It is known as the alveoli and is the functional unit of the lung. The walls of the alveloli are very thin and consist of a single layer of flat epithelial cells. The capillaries lie by its side and thus the air in the lungs is separated from the blood in the capillaries at the most only by two layers of cells. The alveolar pattern helps to have a large surface area for the lungs for efficient inter-change of gases between air and blood. The air in the lungs has to be continuously renewed and this is done by the process of respiration.

The Lung Cavities

The lung occupy a considerable portion of the thoracic cavity which is separated from the abdominal cavity by the muscular portion known as the diaphragm. Each lung is enveloped in a sac of serous membrane called the pleura—hence there are two pleurae. The chest cavity is lined with this membrane also, this layer being known as the paritel pleura, while the lung covering is called the visceral pleura. Pleural cavity is manual space between two layers. Between the lungs is a space called the mediastineum, containing the heart among other things. The entire thoracic cavity is flexible, capable of expanding and contracting a long with the lungs.

Physiology of Respiration

Respiration may be described in another way as the mechanical process of breathing in and out, a function which involves both the respiratory system and the muscles of respiration. The 2 phases of breathing are: (1) inhalation—during which air is drawn into the lungs, (2) Exhalation — which refers to the expulsion of air from the alveoli.

Inhalation is the active phase of breathing, since it is then that the muscles of respiration, notably the diaphragm contract in order to enlarge the chest cavity. The dome of the diaphragm is pulled downward, a partial vacuum is formed in the sealed pleural spaces, causing a pull on the elastic lung tissue so that air rushes in to fill the air sacs.

Exhalation is the inactive phase, since the muscles of respiration then relax, allowing the elastic tissues in the thorax to recoil and the abdominal organs to press up and against the diaphragm. Air is pushed outward by the weight of the chest wall and the upward boost of the abdominal viscera.

Respiratory Rates

Normal rates of breathing vary from 14 to 18 times per minute and are normally higher in children than in adults. The term hyperpnoea means over breathing due to abnormally rapid respiratory movements. Apnoea means a temporary

cessation of breathing. It may be compensatory following forced respiration. In some fevers the respiratory rate increases in direct proportion to the increase of temperature, while in other cases there is no correlation between the respiratory rates and the temperature.

Control of Breathing

Breathing is controlled by the respiratory centre of the brain, which is located in the stem portion called the medulla, immediately above the spinal cord. From this centre, nerve fibres extend down into the spinal cord. From the neck part of the cord these nerve fibres continue through the phrenic nerve to the diaphragm. Unlike the heart the diaphragm does not continue to work if it is cut off from its nerve supply. If one nerve is cut, the diaphragm of that side is paralysed.

The diaphragm and the other muscles of respiration are voluntary in the sense that they can be regulated by messages from the higher brain centres. It is possible for a person deliberately to breathe more rapidly or more slowly, or to hold his breath and not breathe at all for a time. Usually we breathe without thinking about it, while the respiratory centre in the medulla does the controlling. This centre is governed by variations in the chemistry of the blood. If there is an increase in carbon dioxide in the blood, the cells of the respiratory centre are stimulated and they in turn send impulses down the phrenic nerves to the diaphragm.

Functions of Respiration

(1) *Gaseous exchange*—supplies oxygen and eliminates carbon dioxide.

(2) *Excretion*—It excretes volatile substances like ammonia, ketone bodies, essential oils, alcohol, water vapour etc.

(3) *Maintenance of acid base balance*—This is done chiefly by adjusting the amount of carbondioxide elimination.

(4) *Maintenance of temperature balance*—In the expired air large quantity of heat is lost.

Exercise

1. Write the mechanism of respiration.
2. Describe the regulation of respiration.

3. ENDOCRINES

Endocrine glands are the ductless glands which secrete hormones. They pour their secretions directly into blood. The first hormone was discovered by Bayliss in 1903. The function of a hormone is to cause excitation or stimulation of a specific tissue. The site of action may be far away from the gland which produces this hormone. The main endocrine glands in the body are:

(1) Thyroid

(2) Parathyroid

(3) Islets of Langerhans situated in the pancreas

(4) Adrenal glands

(5) Pituitary gland and

(6) Sex glands.

(1) The Thyroid

The thyroid is situated in the midline of neck with two lateral lobes one on either side of trachea joined by an isthmus. It has no duct. Its weight varies from 20-40 gm.

Histologically the thyroid consists of vesicles lined by cubical epithelium and contains a colloidal material. The lining cells are thin when the gland is inactive, whereas it undergoes hypertrophy during excess activity.

Thyroid glands synthesize thyroxine from iodine. Thyroid gets iodine from the blood stream. Iodine is formed by the

reduction of iodine. It is then fixed with tyrosine to form mono and di-iodo tyrosine compounds. Two of the molecules of di-iodo tyrosine combine to form thyroxine.

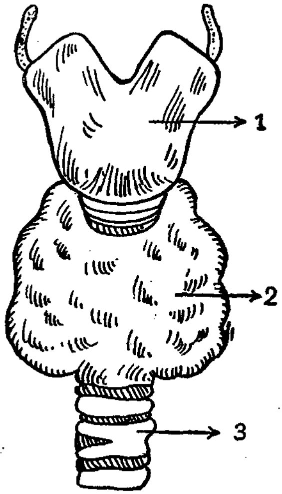


Fig. 5 Thyroid Gland

1. Thyroid cartilage 2. Thyroid gland 3. Trachea

The anterior pituitary plays an important role in the control of the thyroid hormone. Thyroid stimulating hormone produced by the anterior pituitary increases the activity of the thyroid gland. The thyroxine level in the blood controls the production of TSH and whenever the thyroxine falls below a particular level TSH production is stimulated.

Functions of Thyroxine

Thyroxine increases metabolism at the cellular level. It causes an increase in basal metabolic rate, rise in body temperature, increase in appetite, acceleration of heart rate and increased gastro intestinal motility. The signs and symptoms of diseases resulting from depressed activity of the thyroid gland or hypothyroidism depend on what stage the disease manifests itself. In children, hypofunction leads to cretinism. The

symptoms do not appear till after six months because enough hormone is present in mother's milk. The chief features are, the entire growth is stunted and the facial appearance undergoes drastic changes resulting in a sunken nose, lobling tongue, thick lips and muddy dry skin. The milestones of child development such as holding up the head, sitting, standing, walking gets delayed. The child also shows mental idiocy. The BMR is depressed. The disease can be cured if thyroid or at least iodine is administered sufficiently early.

In adults, thyroid deficiency causes Myxodema which is more common among females than in males. There is thickening of subcutaneous tissue with Myxomatous material and decreased BMR. Sex organs degenerate; mental condition gets impaired and dullness, loss of memory, slow heart rate etc. occur. Appetite and motility of gastro intestinal tract are reduced.

Hyper function of thyroid gland leads to exophthalmos. The main features of this syndrome are: protrusion of the eyeball with startling look, decreased body weight, emotional restlessness, skin soft and moist.

Goitre is an enlargement of the thyroid gland. It is caused by the lack of intake of iodine. Therefore this condition is prevalent in regions which are far away from the sea, which is the main source of iodine supply. Mountainous areas in the middle of land masses like Switzerland and the Himalayas are endemic areas of goitre. In such places, iodine can be added to common salt to prevent goitre.

(2) The Parathyroids

The parathyroids are four small yellow oval bodies embedded on the post surface of the thyroid gland. Their size is 6 mm × 3 mm × 2mm. Histologically they consist of masses or columns of cells with large blood sinues in between them. Parathormone is the hormone produced by the parathyroid glands. This hormone is active only in infection. Although the gland is small and the hormones act only on minerals especially

calcium, the parathyroids are extremely important for the economy of the body. Along with the adrenal cortex they claim the distinction of being essential for life.

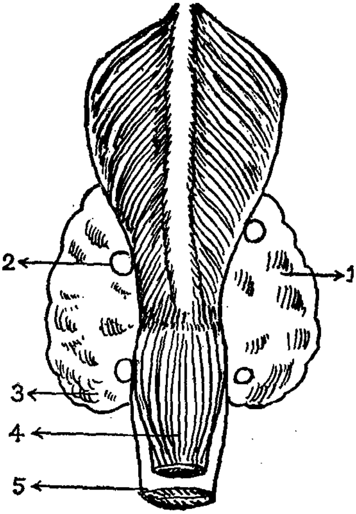


Fig. 6. Parathyroid gland

1. Right parathyroid gland 2. Left parathyroid gland
3. Thyroid gland 4. Oesophagus 5. Trachea

Parathormone mobilizes the ionic calcium from the bones and increases blood calcium concentration. Secondarily it acts on the phosphate level as the calcium and phosphate levels are inversely proportional to one another. When the blood calcium falls from the normal of 10 mg/100 ml. to about 4 or 5 mg/100 ml. tetany results. Tetany is a condition in which there is hyper excitability of the nervous system with intermittent tonic spasms of muscles. When the small muscles of the hand are affected, the hand is held in the same position as that of the midwife; hence it is known as carpo-pedal spasm. When the laryngeal muscles are involved, laryngismus stridulous is seen. If the tetany is not treated, it leads to convulsions and death. Tetany can be treated by administration of high doses of

calcium intravenously. Vitamin D helps in the absorption of calcium from the intestines.

Hyper para thyroidism results in the mobilization of calcium from the bones causing osteoporosis. It occurs usually due to parathyroid tumour and causes pain in the bones and weakness. Sometimes it may lead to fracture of the bone.

(3) Endocrine Portion of Pancreas

Pancreas is an exocrine as well as an endocrine gland. It is an elongated structure lying across the posterior wall of the abdomen. It consists of head, body and tail. Head fits into the curve of the duodenum. The body and tail are directed towards the left. Histologically it is composed of acini or alveoli. In between the acini small groups of cells, are present. These are the islets of Langerhans. There are two main types of cells in this tissue, the Alpha and Beta cells. The β cells produce an important hormone called insulin. The α cells secrete another hormone called glucagon.

The main function of insulin is to reduce the blood sugar level by the formation of glycogen from glucose and by cellular utilization of glucose. On the other hand Glucagon raises the blood sugar level.

Diabetes mellitus occurs due to lack of production of insulin or deficiency of its action. which consequently leads to a rise in the blood sugar level. This condition is known as 'hyperglycaemia'. Hyperglycaemia leads to the condition 'Glycosuria' in which sugar is excreted through the urine, indicating diabetes. By taking a high protein, low carbohydrate diet, diabetes can be kept under check. If diabetes cannot be controlled by diet alone, insulin must be administered by injection.

(4) Adrenal Glands

The adrenal glands are a pair of triangular flattened bodies, one at the pole of each kidney weighing about 12 gm. Each

adrenal gland has two parts: (*i*) the outer portion called the 'Cortex' and the inner portion called the 'Medulla'.

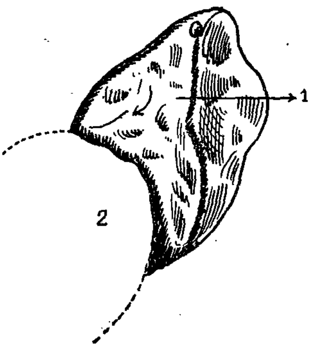


Fig. 7. Adrenal gland
1. Adrenal gland 2. Right kidney

The Adrenal Cortex

Adrenal cortex is essential for life. Histologically the adrenal cortex is composed of three layers. Outer is the zona glomerulosa, next the zona faciculata and the inner layer zona reticularis. The adrenal cortex secretes three hormones gluco corticoids, mineralo corticoids and sex hormones. The gluco corticoids act mainly as antagonists to insulin and thus cause increase in blood sugar, especially by conversion of protein to sugar. The mineralo corticoids have their main action on sodium and potassium and help in the conservation of sodium in the body. The adreno cortico trophic hormone secreted from the anterior pituitary increases the secretion of adrenal cortical hormones.

In conditions such as Addison's disease, which is commonly due to tuberculosis of the adrenal gland, the secretion of both medullary and corticoid areas fall low. Consequently, there is hypotension and fall in blood sodium level. The disease is fatal. In increased adreno cortical activity, sex hormones are seen in greater amounts and changes in sex characteristics leading to masculinization in females and feminization in male result.

Adrenal Medulla

The adrenal medulla is the inner portion of the adrenal gland to the cortex. Adrenal medulla secretes Adrenaline and Non-adrenaline.

Adrenaline causes dilation of the pupils and improves visual acuity. It increases both the rate and the amplitude of contraction of the heart and consequently raises the cardiac output. It produces vasoconstriction of the vessels of skin and raises the blood pressure. It increases the rate and amplitude of respiratory movements and causes dilation of the bronchioles leading to increased pulmonary ventilation. It produces glycogenolysis and raises the blood sugar level. It has a calorigenic action, and raises body heat. It causes dilation of the walls of the intestines and the urinary bladder and constriction of the sphincters. The action of non-adrenaline is similar to that of adrenaline except in a few instances. For example Adrenaline increases the heart rate, whereas Non-adrenaline decreases heart rate.

Hyper function of adrenal medulla leads to paroxysmal hypertension where elevation of blood pressure is the chief symptom. Symptoms of lack of adrenaline supply is seen in Addison's disease characterized by hypotension and muscular weakness.

(5) Pituitary Gland

The pituitary gland is a small nut like structure situated at the base of the brain. Anatomically it consists of two parts—the anterior lobe and posterior lobe.

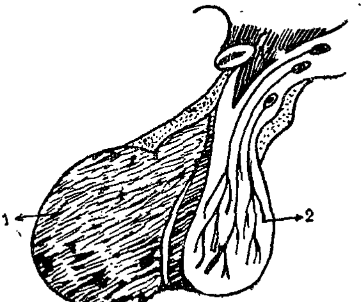


Fig. 8. Pituitary gland
1. Anterior lobe 2. Posterior lobe

Anterior Lobe

The anterior lobe produces the following hormones :

(*i*) Growth hormone or somatotrophic hormone (STH)

(*ii*) Thyrotrophic hormone

(*iii*) Adrenocortico trophic hormone (ACTH)

(*iv*) Follicle-stimulating hormone (FSH)

(*v*) Lactogenic hormone and

(*vi*) Luteinising hormone in female (LH) or Interstitial cell stimulating hormone (ICSH)

These hormones exert a profound effect on the other endocrine glands. In fact, the anterior lobe of the pituitary controls the rest of the endocrine system.

(*i*) *Growth hormone*: Growth hormone facilitates the growth of the body. An excessive production of growth hormone before puberty—will produce enhanced skeletal growth and will cause the person to become a giant, whereas, lowered production of hormone in the same age will cause dwarfism. Overactivity leads to excessive development of certain regions such as the jawbone and limb-bones and cause the condition known as acromegaly.

(*ii*) *Thyroid stimulating hormone* : This hormone acts on the thyroid gland and increases the secretion of thyroxine. The circulating level of Thyroxine controls the secretion of T.S.H.

(*iii*) *Adreno cortico trophic hormone*: The ACTH is an important hormone which is capable of increasing the production of all the hormones of the adrenal cortex, except Aldosterone.

(*iv*) *Follicle stimulating hormone*: This hormone controls the sex glands and initiates puberty. It controls the processes of ovulation in females and spermatogenesis in males. It also causes the secretion of oestrogen from the ovary.

(*v*) *Lactogenic hormone or prolactin* : Lactogenic hormone acts on the mammary gland especially if it has already been

primed with oestrogen and progresterone. It helps in the formation and flow of milk during lactation, when the child sucks.

(*vi*) *Luteinising hormone or interstitial cell stimulating hormone*: In females, this hormone causes appearance, growth and persistence of corpus luteum. It also stimulates the secretion of progestin. In males, this stimulates the interstitial cells of testes to secrete testosterone.

Posterior lobe of the Pituitary

Altbough the posterior lobe is situated just behind the anterior lobe, the posterior lobe is really a part of the nervous system and should be considered as an extension of the hypothalamus. The posterior lobe produces two main hormones—Oxytocin and Vasopressin.

Oxytocin has a specific action on the smooth muscles, especially that of the uterus. It produces powerful contractions of the uterus and helps in parturition.

Vasopressin acts on the smooth muscle of the arterial system and brings about vasoconstriction and consequent increase in blood pressure. This hormone is otherwise known as antidiuretic hormone and helps in the reabsorption of water from the distal convoluted tubule. If there is any deficiency in the production of the posterior pituitary hormones, water is not reabsorbed, and large amount of urine will be excreted. This condition is known as 'Diabetes insipidus'.

Exercise

1. Write the structure and functions of the thyroid gland.
2. Write the structure and functions of the adrenal gland.
3. Write the various hormones secreted by the anterior lobe of pituitary and their actions.

4. REPRODUCTIVE SYSTEM

The male reproductive organs include: testes, epididymis, vas deferens, seminal vesicles, ejaculatory duct, prostate gland and penis, The female-reproductive organs include: ovaries, fallopian tubes, uterus and vagina. Of these, the testes and ovaries are called the primary sex organs or the gonads. The remaining structures are collectively known as secondary sex organs. Both males and females are fundamentally bisexual. In male, the masculine features predominate, the feminine features remain rudimentary. In female, it is just the reverse. The urine of both sexes contains both male and female hormones but in different proportions.

Male Reproduction Organs - Testes

The testes consists of two somewhat flat oval bodies one on each side, remaining inside the scrotum. The testes is covered

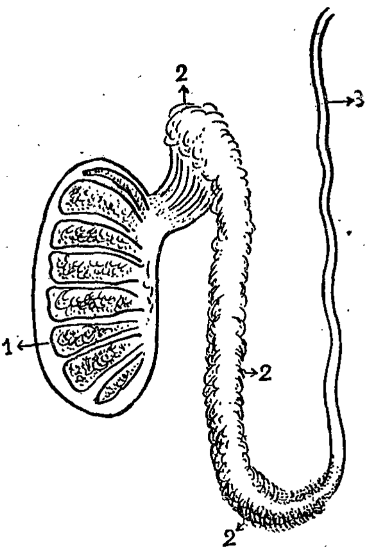


Fig. 9. The Internal Structure of the Testes
1. Testes 2. Epididymis 3. Vas deferens

by a tough compact fibrous capsule from which traboculae descend and divide the gland into a number of pyramidal

lobules. The lobules are filled up with convoluted seminiferous tubules in which the sperms are formed. The sperms then empty into the vasa recta and from there into the epididymis. The epididymis leads into the vas deferens which enlarges into the ampulla of the vas deferens immediately proximal to the prostate gland. The ejaculatory duct passes through the prostrate gland to empty into the internal urethra. Interstitial cells are found between the tubules. They are known as interstitial cells of Leyig. They are abundant in early foetal life, then gradually diminish during childhood, increase again at puberty and diminish in old age. These cells secrete the hormones androgen and testosterone.

Functions of the Testes

The testes serve the following functions :

(*i*) Spermatogenesis

(*ii*) Secretion of hormones

Spermatogenesis

Sperms are formed from spermatogonia cells after puberty. These spermatogonia cells are present in the seminiferous tubules. Before puberty, mature spermatozoa are not formed. It ceases in old age. Spermatogonia divide into spermatocytes: primary and secondary. The secondary spermatocytes undergo reduction division and form the spermatids. Therefore the spermatids contain only half the number of chromosomes (*i.e.*) 24. The spermatids mature into spermatozoa.

The spermatozoa consists of head, neck, tail and end-piece. The head is the nucleus. Anteriorly, the nucleus is covered by a cap—the 'acrosome'. The next portion is the neck which contains centrioles. The tail consists of a spiral mitochondrial sheath surrounding a group of fibres. The end piece consists of the extreme portion of the fibrils which remain naked without any covering. FSH secreted from the anterior pituitary controls spermatogenesis.

The testes also secrete two hormones (*a*) Androgen; which maintains spermatogenesis and sexual activity and (*b*) Testo-

sterone. Absence of testosterone causes degeneration of the seminiferous tubules and spermatogenesis fails to occur. The subject becomes sterile and secondary sex organs degenerate.

Female Reproductive Organs

The female reproductive system includes ovaries, fallopian tubes, uterus and vagina.

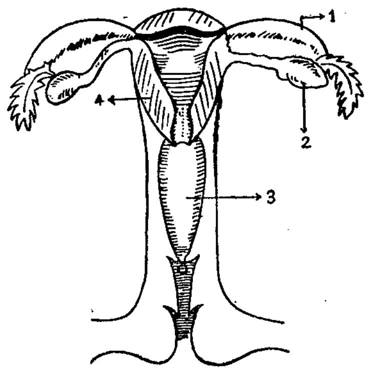


Fig. 10. Female Reproductive Organ

1. Fallopian Tube 2. Ovary 3. Vagina 4. Uterus

The fallopian tube is muscular having an inner mucous membrane. One side is attached to the uterus and the other side extends laterally and terminates as a fimbriated margin near the ovaries. The uterus is a thick walled pear shaped muscular organ, the inside of which is hollow. It has a body and its lower part is cervix. This muscular organ is lined by mucous membrane known as 'endometrium'. The uterine endometrium undergoes cyclic changes during different phases of menstrual cycle. Functionally the uterus plays an important role in maintaining the growth and the development of the embryo. The ovum which is discharged from the ovary is transported to the uterus along the fallopian tube. The fertilised ovum after segmentation and division is embedded in the endometrium of the uterus. Placenta is then formed with the dual shares of the embryonic and maternal tissue. The placenta

thus formed maintains the nutrition, respiration and excretion of the embryo until parturition.

Vagina

The vagina is a muscular membranous tube lined by non-keratinised stratified squamous epithelium. The lining is thrown into folds or 'rugae'. No glandular structure is present in the vagina.

Ovaries

The ovaries are two somewhat bean shaped bodies, lying one on each side near the free end of the fallopian tubes. An ovary consists of the following elements:

(*i*) *The germinal epithelium*: It is the outer most covering. It is the parent tissue from which the primitive graffian follicles develop.

(*ii*) *Tunica albugina:* This is made up of collagenous connective tissue found under the germinal epithelium.

(*iii*) *Stoma:* It is a connective tissue network continuous with *Tunica albugina* and containing involuntary muscle fibres. It supports the ovarian tissues and carries blood vessels, lymphatics and nerves.

(*iv*) *Graafian follicles*: These are small islands of cells in various stages of development and scattered mostly at the peripheral part of the ovary. The immature ones are called the primordial follicles. The central cell is the ovum. The remaining cells surround the ovum in a single layer forming a sort of capsule. When the Graafian follicle is fully matured, it ruptures. The follicle usually takes 10-14 days, This proccss of rupture of the Graafian follicle is called the 'ovulation'. It forms the female gamete (ovum) and secretes oestrogen.

Oestrogen is responsible for all the puberty changes, the proliferative stage of menstruation and growth of uterus during pregnancy. It also acts along with oxytocin and helps in parturition.

(v) Corpus luteum: When the Graafian follicle ruptures, corpus luteum develops on the temnants of the ruptured follicles. In the absence of pregnancy, it persists upto 27th day and degenerates on the 28th day. If pregnancy occurs it persists to about four to five months. The corpus luteum secretes progestrone which is essential for the maintenance of pregnancy. Progestrone completes the development of breast during pregnancy. It inhibits ovulation during pregnancy. It causes enlargement of the birth canal. It is essential for the embedding of ovum and the formation of placenta.

(vi) Interestitial cells: These are polyhydrel cells found in between Graafian follicles. These cells secrete oestrogen.

Development of the human reproductive system

The Gonads arise from the genital ridge near the adrenal gland. The gonad develops a cortex and a medulla. Until the sixth week of development, the structures are identical in both sexes. In genetic male, the medulla develops during the seventh and eighth weeks into a testis and the cortex regresses. Leydig cells appear and androgen is secreted. In genetic females, the cortex develops into an ovary and the medulla regresses. The embryonic ovary does not secrete hormones. In early foetal life, the testes remain within the abdomen. During the eighth week of gestation the testes move caudally from their position, then gradually migrate and descend into the scrotum, by the time the child is born.

Embryology of the genitalia

During the seventh week of gestation, the embryo has both male and female primordial genital ducts. One or the other of these duct system develops forming male or female internal genitalia and the other regresses. The external genitalia are similarly bipotential until the eighth week. Thereafter, the urogenital slit disappears and the male genitalia form, or alternatively, it remains open and the female genitalia form.

Exercise

Write the structure and functions of the ovary.

Reference Books

1. An Introduction to Human Physiology
   by *Dr. K. Madhavan Kutty*

2. Structure and function of the Human Body
   by *Ruth Lundeen Memmler*, M. D.

3. Samson Wright's applied Physiology by *Samson Wright*

4. Human Physiology by *Chatterjee*

5. Physiology and Biochemistry
   Bell, Davidson & Scarborough

6. Review of Physiological Chemistry by *Harper*

7. The living body by *Best and Taylor*

CHAPTER II

FOOD AND NUTRITION

1. BALANCED DIET

We need an adequate or a balanced diet so that it provides all the essential nutrients in sufficient quantities and proper proportions to meet the needs of the body. Thus a balanced diet is one which is balanced in quantity and quality, catering to the requirements of growth, development and maintenance of health and regulation of the body functions.

The important factors to be considered in the formulation of a balanced diet are

(1) Knowledge of the daily nutritional requirements (2) Selection of foods which will supply the daily nutritional requirements. (3) Planning of meals (4) preparation of meals and (5) serving of meals.

(1) Knowledge of Daily Nutritional Requirements

The requirement of the body for calories and various nutrients depend on the age, physical work and other physiological conditions. Because of the larger size of the body an adult requires more nutrients than does a small child. Being larger, a man needs more calories and proteins than a woman. When a woman is pregnant or nursing her baby, she needs more calories and protein. Her need is far more and special foods during these critical periods are essential.

Children being small, need less calories and proteins. However, because of growth, they need more calories and proteins per kilogram of body weight. They do have some special needs for calcium and iron. Calcium is required for the growth of bones and teeth and iron is required for the haemoglobin. Vitamin A is very important for eyesight. The Indian Council

of Medical Research (ICMR) has recommended the daily allowances for nutrients as given in Table–I.

The recommended intakes are based on averages. Therefore they are only guidelines for the maintenance of health in nearly all people. The recommendations apply to amounts of nutrients required by the people in their new age. Nutrient losses may occur in the farm, storage, factories, wholesale and retail distribution, cooking or in plate and these need to be taken into consideration.

(2) Selection of foods

After determining the amount of calories, proteins, minerals and vitamins required, the foods which will supply them in adequate quantities must be known. The types of food available locally during different seasons, how much money one can afford to spend on food, eating habits (vegetarian or non-vegetarian), culture, pattern of living, religion and regional background should also be considered.

In order to know which foods and how much of each are to be included to constitute an adequate diet, certain food groups have been developed in which foods of similar nutritive value are classified together. An adequate diet can be developed by taking sufficient quantities of foods from these different groups. These groups are flexible and allow wide choice of foods. One such classification has been recommended by ICMR that is Basic Five.

The ICMR has also drawn lists showing the quantities of various foods which men, women, older children and younger children need to eat, to make up a balanced diet. Table—II shows the quantities of various food stuffs in grams recommended by the ICMR. Both vegetarian and non-vegetarian diets are shown.

TABLE—I

Daily Allowance of Nutrients for Indians

(Recommended by the Nutrition Expert Group in 1968)

Group	Particulars	Calories	Proteins (gm)	Calcium (gm)	Iron (mg)	Vitamin A: Retinol (ug)	Vitamin A: B-Carotene (ug)	Thiamine (mg)	Riboflavin (mg)	Nicotinic Acid (mg)	Ascorbic Acid (mg)	Folic Acid (ug)	Vitamin B_{12} (ug)	Vitamin D (Iu)
Man	Sedentary work	2,400	55	0.4	20	750	3,000	1.2	1.3	16		100	1	
	Moderate work	2,800		to				1.4	1.5	19	50			
	Heavy work	3,900		0.5				2.0	2.2	26				
Women	Sedentary work	1,900	45	0.4	30	750	3,000	1.0	1.0	13				
	Moderate work	2,200		to				1.1	1.2	15	50	100	1	
	Heavy work	3,000		0.5				1.5	1.7	20				
	Pregnancy (Second half of pregnancy)	+300	+10	1.0	40	750	3,000	+0.2	+0.2	+2	50	150-300	1.5	
	Lactation (upto 1 year)	+700	+20	1.0	30	1,150	4,600	+0.4	+0.4	+5	80	150		200

Infants	0-6 months		120/kg	2.3-1.8/kg	0.5 to 0.6	1.0 mg/kg/	400	—	—	—		30	25	0.2
	7-12 months		100/kg	1.8-1.5/kg			300	1,200	—	—				
Children	1 year			17	0.4 to 0.5	15 to 20	250	1,000	0.6	0.7	8			
	2 years		1,200	18										
	3 years			20										
	4-6 years		1,500	22			300	1,200	0.8	0.8	10			
	7-9 years		1,800	33			400	1,600	0.9	1.0	12			
	10-12 years		2,100	41			600	2,400	1.0	1.2	14	30 to 50	50 to 100	0.5 to 1.0
Adolescents	13-15 years	Boys	2,500	55	0.6 to 0.7	25	750	3,000	1.3	1.4	17			
		Girls	2,200	50		35			1.1	1.2	14			
	16-18 years	Boys	3,000	60	0.5 to 0.6	25	750	3,000	1.5	1.7	21			
		Girls	2,200	50		35			1.1	1.2	14			

TABLE—II

Various Foodstuffs Needed to give us a Balanced Diet

Name of the Foodstuffs	Adult man-moderate work		Adult woman moderate work		Additional Allowance During		Adolescent Boys 13 to 15 years		Adolescent Boys 16 to 18 years	
	Veg. gm.	Non-Veg. gm.	Veg. gm.	Non-Veg. gm.	Pregnancy gm.	Lactation gm.	Veg. gm.	Non-Veg. gm.	Veg. gm.	Non-Veg. gm.
Cereals	475	475	350	350	50	100	430	430	450	450
Pulses	80	65	70	55	...	10	70	50	70	50
Green Leafy Veg.	125	125	125	125	25	25	100	100	100	100
Other Vegetable	75	75	75	75	...	...	75	75	75	75
Roots and Tubers	100	100	75	75	...	...	75	75	100	100
Fruits	30	30	30	30	...	...	30	30	30	30
Milk	200	100	200	100	125	125	250	150	250	150
Fats and Oils	40	40	35	40	...	15	35	40	45	50
Meat and Fish	...	30	...	30	...	...	...	30	...	30
Eggs	...	30	...	30	...	...	...	30	...	30
Sugar and Jaggery	40	40	30	30	10	20	30	30	40	40
Groundnut	...	...	...	...	...	...	...	...	50*	50*

*An additional 30 gm. of fats and oils can be included in the diet in the place of groundnut.

<table>
<tr><th rowspan="3">Name of the Foodstuffs</th><th colspan="2">Adolescent Girls</th><th colspan="4">School Children</th><th colspan="2">Pre-school Children</th></tr>
<tr><th colspan="2">13 - 18 years</th><th colspan="2">10 - 12 years</th><th colspan="2">7 - 9 years</th><th colspan="2">4 - 6 years</th></tr>
<tr><th>Veg. gm.</th><th>Non-Veg. gm.</th><th>Veg. gm.</th><th>Non-Veg. gm.</th><th>Veg. gm.</th><th>Non-Veg. gm.</th><th>Veg. gm.</th><th>Non-Veg. gm.</th></tr>
<tr><td>Cereals</td><td>350</td><td>350</td><td>320</td><td>320</td><td>250</td><td>250</td><td>200</td><td>200</td></tr>
<tr><td>Pulses</td><td>70</td><td>50</td><td>70</td><td>60</td><td>70</td><td>60</td><td>60</td><td>50</td></tr>
<tr><td>Green Leafy Veg.</td><td>150</td><td>150</td><td>100</td><td>100</td><td>75</td><td>75</td><td>75</td><td>75</td></tr>
<tr><td>Other Vegetables</td><td>75</td><td>75</td><td rowspan="2">75</td><td rowspan="2">75</td><td rowspan="2">50</td><td rowspan="2">50</td><td rowspan="2">50</td><td rowspan="2">50</td></tr>
<tr><td>Roots and Tubers</td><td>75</td><td>75</td></tr>
<tr><td>Fruits</td><td>30</td><td>30</td><td>50</td><td>50</td><td>50</td><td>50</td><td>50</td><td>50</td></tr>
<tr><td>Milk</td><td>250</td><td>150</td><td>250</td><td>200</td><td>250</td><td>200</td><td>250</td><td>200</td></tr>
<tr><td>Fats and Oils</td><td>35</td><td>40</td><td>35</td><td>35</td><td>30</td><td>30</td><td>25</td><td>25</td></tr>
<tr><td>Meat and Fish</td><td>...</td><td>30</td><td rowspan="2">...</td><td rowspan="2">30</td><td rowspan="2">...</td><td rowspan="2">30</td><td rowspan="2">...</td><td rowspan="2">30</td></tr>
<tr><td>Eggs</td><td>...</td><td>30</td></tr>
<tr><td>Sugar and Jaggery</td><td>30</td><td>30</td><td>50</td><td>50</td><td>50</td><td>50</td><td>40</td><td>40</td></tr>
<tr><td>Groundnut</td><td>...</td><td>...</td><td>...</td><td>...</td><td>...</td><td>...</td><td>...</td><td>...</td></tr>
</table>

Basic Five



Fig. 11. Five Basic Foods

1. Cereals, starchy vegetables
2. Fats and oils, sugar and jaggery
5. Milk and milk products, pulses and nuts
4. Fruits, green leafy vegetables
5. Other vegetables

(3) Planning of meals

Planning the daily allowances of foods in terms of meals and distributing the different foods among the meals taken during the day are very important in the formulation of balanced diets.

Good meal planning aims are not only selection of adequate foodstuffs but also adequacy of foods in each meal. While planning the meals the points to be considered are size of the family, age and sex of the members, their occupation and activities, resources, cost of food, customs, season, locality, food preferences and the need for preparing special diets for abnormal conditions. To cut down labour and expenditure, meals should be so planned in such a way that the menu satisfies the nutritional needs of various members. Time can be saved in food preparation by (*a*) Planning for several days (*b*) Listing the market list (*c*) Shopping in a less crowded place (*d*) Simple method of cooking and (*e*) Keeping in with work schedule.

All the meals should be planned together as one unit, so that the total food needs are distributed evenly. In planning menus it must be remembered that items from each group should be used for the day.

At least one cheap green leafy vegetable should be included in a meal of the day. It can be combined with other foods. Raw vegetables and fruits must be included at least once a day. Parboiled rice and sprouted pulses can be used. Same food repeated in the same meal does not show good planning.

(4) Preparation of meals

In a good menu, the foods should be properly combined, attractive and pleasing in colour, form and texture and they should give the maximum satisfaction and nutritive value for the money spent.

Foods properly cooked and attractively served are appetising. In cooking methods used generally, some nutrients like vitamin B and C are lost by cooking. Care must be taken to see

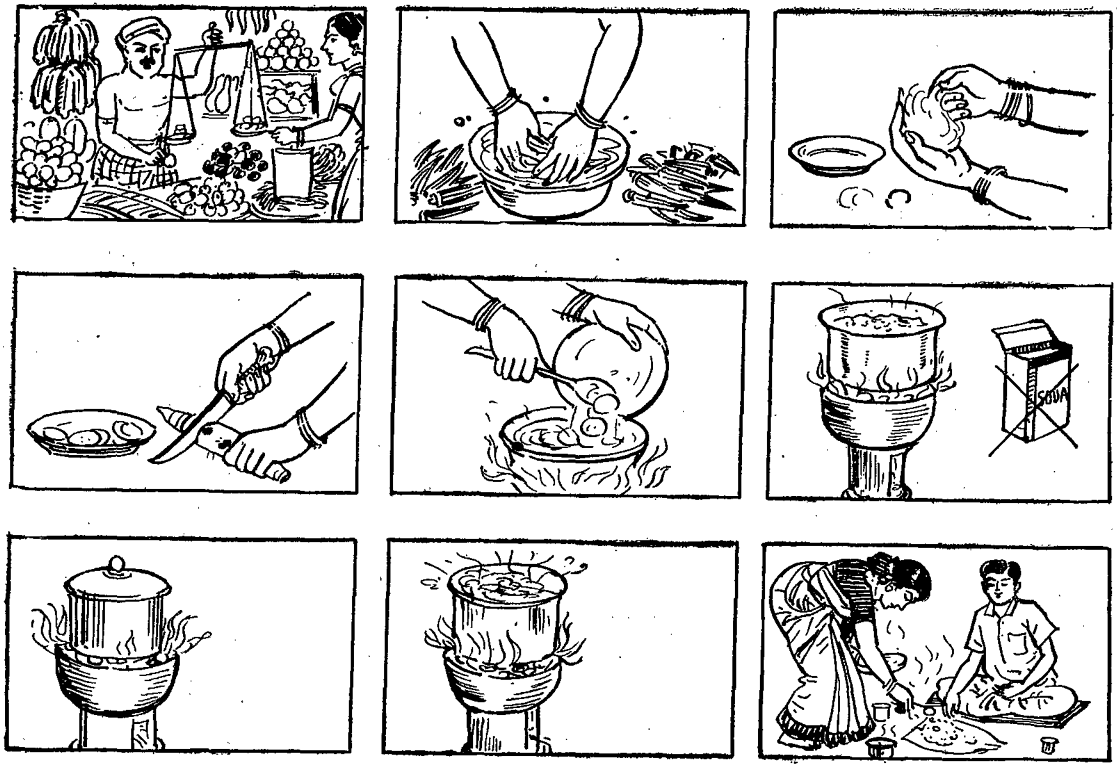


Fig. 12. Factors to be Considered While Cooking Vegetables

Buy fresh vegetables; Wash before cutting; Peel the skin slightly; Cut into large pieces; Add the vegetables to boiling water; Avoid soda; Cook in covered vessels; Avoid prolonged cooking; Serve hot

that proper methods of cooking are employed. Excess cooking water used for cooking cereals or vegetables should not be discarded. They can be used instead of water in rasam and gravies. Valuable vitamins and minerals are washed out of rice into the conjee. Discarding the conjee is a common problem which brings about loss of nutrients.

Vegetables should be washed just before cooking and should be cut into fairly large pieces to conserve nutrients during cooking. Skins of vegetables must be removed as thinly as possible. Roots and tubers can be boiled with the skins intact removing them later.

Soda should never be used during cooking since it destroys vitamins. Addition of acidic substances like tamarind juice, lime juice, sour buttermilk will reduce destruction of several nutrients (especially vitamin C). Pressure cooking of food is better because it is quicker and is carried out in closed atmosphere, leads to greater conservation of nutrients than open boiling.

Foods can also be eaten in the raw state in the form of salads. Salads are appropriate for any course of a meal and present an appetising means of serving fruits and vegetables. Meat, cereal and dairy products offer additional variety as salad ingredients. When a salad is planned, consideration should be given to its role in the meal arrangement, colour, flavour and texture.

Salads besides adding colour, flavour and texture to a meal add various nutrients. Fresh vegetables and fruits are valuable sources of vitamin C. Orange and lime slices in salads contribute considerable vitamin C. Vegetables and fruits also contribute carotene, B complex vitamins and minerals. Since vegetables and fruits are eaten in raw form the problem of loss of nutrients in cooking is not encountered.

(5) Serving of meals

The place where food is served should look beautiful and comfortable. The temparature at which food is kept is essen-

tial for the maintenance of its flavour and taste. When meals are served in pleasant surroundings and eaten without hurry or strain, appetite is stimulated and digestion and metabolism are greatly facilitated. Cleanliness should be maintained in respect of everything coming into contact with food.

Exercise

1. What is balanced diet? Plan a balanced diet for an adolescent girl.
2. Visit the nearby market, observe the basic food groups and compare the cost per kilogram of each food.
3. Study the food beliefs existing in 20 families of your locality.
4. Study the food intake of 20 families in your locality and compare with the recommended allowances.

2. THERAPEUTIC DIETS

The importance of diet in the treatment of diseases was emphasized by the ancient Greek and Roman physicians. The judicious use of foods as therapeutic agents is revolutionizing the practice of medicine.

All therapeutic diets are modifications of the normal or adequate diet pattern. The Normal diet in a hospital may be described as regular, general, house or full diet. The general liquid, light and soft diets may be reformed to as house diets. In some hospitals the general diet is also known as regular or house diet which is:a normal diet.

Principles of diet in the treatment and prevention of disease

1. The therapeutic diet should vary from the adequate normal diet as little as possible.
2. The diet should meet the body requirements for essential nutrients as generally as the disease condition permits.

3. The diet regimen should take into account the patient's food habits, taboos, economic status, religious factors and the environmental factors.

Modifications of normal diet

The adequate normal diet may be modified and thereby become a specific therapeutic diet.

Adjustment in diet may take place in the following forms:

1. Change in consistency of foods.
   e.g. liquid diet or soft diet or low residue diet.

2. Increase or decrease in energy value of the diet.
   e.g. Reduction diet, high calorie diet.

3. Increase or decrease in type of foods.
   e.g. High calorie diet, sodium restricted diet.

4. Omission of specific foods.
   e.g. Allergy diet.

5. Adjustment in the ratio and balance of food constituents Protein, fats and carbohydrates.
   e.g. Diabetic diet, low fat diet.

6. Rearrangement of the number and frequency of meals.
   e.g. Gastric ulcer diet.

Diet must be flexible to be practical and usable.

Nomenclature of diets

When the quantity of one or more nutrients is important to the success of the diet, it is essential that these quantities be specified in the diet prescription. Thus the term diabetic diet has little meaning while a prescription for 200 gm. carbohydrate, 80 gm. protein and 90 gm. fat can be accurately interpreted.

Others have used the name of a disease condition to specify a given diet, such as ulcer and cardiac diets. Psychologically

this is not a good practice for the patient should not need to be reminded of his condition every time he looks at the diet list.

Therapeutic diets may be classified as qualitative and quantitative modifications of the normal diet.

The Light Diet: This is an adequate diet. Generally speaking it is used for a limited period or until the patient is ready to accept a general diet. It is considered as a transitional diet. The chief difference between light and general diet is that very simple preparation of the foods is allowed. Fried foods, highly seasoned foods, rich pastries, coarse foods and fatty foods are omitted.

The hospitals may either have a soft diet or a light diet.

Soft Diet: The soft diet is used as a transition diet. Since the present trend in diet therapy is towards a more liberal interpretation of diet and foods allowed, the soft and light diets are frequently combined.

Mechanical Soft Diet: Many persons require a soft diet simply because they have no teeth. The objective of dietary planning for such individuals is to modify the normal diet so that foods require little chewing. The terms mechanical, soft and dental soft are used in some diet manuals to describe such a dietary modification.

Soft diet represents the usual dietary step between the full fluid and normal diet. It may be used in acute infections, some gastro intestinal disturbances and following surgery. The diet is soft in consistency, easy to chew, made up of simple, easily digestible food and contains no harsh fibre, no rich or highly flavoured food. It is nutritionally adequate.

Liquid Diets: Fluid diets are used in febrile states, post operatively or whenever the patient is unable to tolerate solid foods. The degree to which these diets are adequate will depend upon the type of liquids permitted.

Clear Fluid Diets: Whenever an acute illness or surgery produces a marked intolerance for food as may be evident by

nausea, vomiting, anorexia, distention and diarrhoea, it is advisable to restrict the intake of nutrients. A clear fluid diet is usually used for 1 to 2 days, at the end of which time the patient is usually able to retain and utilize a more liberal liquid diet.

Tea with lemon and sugar, coffee, fat free broth, carbonated beverages and cereal waters are usually given. A more liberal clear fluid diet permits use of egg white and gelatin to strained fruit juices. Clear fluid diet is usually restricted to 30 to 60 ml. per hour first and later increased.

Full Fluid Diet: This diet is indicated whenever a patient is actually ill or unable to chew or swallow solid food. It includes all foods liquid at room and body temperature, free from cellulose and other initiating condiments. Six or more feedings can be given.

Other methods of feeding

Food by mouth is the method of choice when patient can eat, digest and absorb sufficient food to meet his nutritive requirements. When the patient is unable to swallow because of deformity or inflamation of the mouth or throat muscles, corrosive poisoning, tube feeding is used.

Intravenous feeding is given when it is necessary to rest the stomach. Transfusions of whole blood or of plasma are commonly used.

Soft Diet: Many patients are placed on a soft diet till diagnosis of a disease is made. It is the most frequently used diet. Though the diet is soft in texture and bland in flavour this diet is adequate. When soft diet is given it is given three times a day. The average composition of the soft diet is 1,800 to 2,000 kilo calories. This may be adjusted according to the individual's needs.

Mild flavoured, low-fibre vegetables, cooked fruits without seeds or skin, ripe banana, white bread, cakes, tender meat and fish and milk products can be included in the diet.

Strongly flavoured and high fibred vegetables, raw fruits, coarse cereals, tough meats and fried foods and highly seasoned foods are to be omitted.

Clear Fluid Diet : A clear fluid diet is given in acute infections, in acute inflammatory conditions of the intestinal tract, in acute diarrhoea and after operation of colon or rectum. This diet can also be given to relieve thirst and to supply fluid.

The clear fluid diet as its name indicates is very clear. It leaves no residue and is non-irritating. Since this diet is not adequate, it should not be used for more than two days.

Hot beverages like tea, coffee and coffee substitutes, broths without fat, carbonated beverages, strained juices can be included.

Egg nogs, gruels and fruit juices are permitted on a more liberal diet. The amount given is restricted to 30 to 60 ml. per hour at first with gradually increasing amounts being given as the patient's tolerance improves. The average clear or restricted liquid diet contains 400 to 500 kilo calories, 5 grams of protein, fat 100 to 120 gm. of carbohydrate.

Full Fluid Diet : This diet is given to patients who are too ill to eat solid or semi solid foods, who have gastritis, acute infections, diarrhoea when milk is permitted and following surgery.

Foods which are liquid or become liquid on reaching the stomach come under this diet. This diet may be made adequate and be used for an extended period of time. The average composition of the diet is approximately 1,300 to 1,500 kilo calories, 45 gm. protein, 65 gm. carbohydrate. The intervals of feeding can be 2-4 hours.

In a clear fluid diet, all fluids, milk beverages, soft custard, plain icecream and fruit juices can be included.

Tube Feeding : Tube feedings are most frequently employed in the nutritional therapy of surgical patients. When the

patient is unable to take food by mouth following surgery, accidents, unconsciousness or when part of the body is dissected, adequate nutrition must be supplied by a liquid meal which can be put through a tube.

Such feedings may vary from a mixture of the foods served in the adequate normal diet finely homogenized in a mechanical blender and strained to ensure passage through the tube, to food combinations planned to meet specific therapeutic needs.

Tube feedings are usually administered through a nasogastric tube. However, when the normal continuity of the oesophagus is not intact, a surgically established fistula between the stomach and the outer abdominal wall is made for the artificial feeding.

The amount of the feeding is decided by the physician. The feedings may be hourly first, and then every 3 to 4 hours.

Very Low Residue Diets: This diet is given to give rest to the gastro intestinal tract. Foods which can be completely absorbed leaving no residue for formation of faeces are chosen.

This type of diet is given in early stages of ulcerative colitis, following operations of the colon and when there is partial obstruction of the intestine. When there is partial obstruction of the intestine nothing is given by mouth until gastro intestinal function has been resumed. Drainage of the stomach and upper intestine is essential until there is reduction of distention and passage of gas. During this time intravenous therapy is given, when the patient shows tolerance for water, broth and tea, a very low residue diet may be introduced.

Eggs, tender meat, fish or poultry, fruit juices, refined cereals, clean soups, coffee and tea may be included. Milk, cheese, vegetables, fruits, coarse cereals and their products, fried foods and condiments and spices should be avoided.

Bland Diet: A bland diet is given to neutralize acid, to reduce gastric secretion and motility.

This diet is given when there is gastric and duodenal ulcers, gastritis, diarrhoea and ulcerative colitis.

Foods that are mild in flavour and low to moderate in fibre content may be used. When used for ulcers the diet can be given in three stages with small frequent feedings, because presence of food in the stomach reduces the corrosive action of the acid.

In the first stage of peptic ulcer, 90 to 120 milli litres of milk or milk and cream are given at one to two hour intervals till the pain disappears.

In the second stage as the pain disappears small feedings of soft fibre foods are added to or supplemented for some of the milk or milk and cream feedings. The size of the feedings is increased and interval between the feedings is increased.

Milk toast, soft cooked eggs, well boiled rice, strained cream soup, strained dhal water, white bread and butter, puddings, custard, vanilla icecream can be used.

In the third stage six feedings are used. The sixth feeding is added at bedtime and service of food closely follows the usual meal pattern. This diet may contribute approximately 2,620 kilocalories. If calories are to be reduced, cream and fat can be reduced. In this stage besides the foods included in the II stage, ground and tender meat, fish and poultry can be used. Well cooked cereal products can be used. Well cooked potatoes, cooked vegetables and fruits, and fruit juices can be used.

The foods usually restricted are foods with seeds, skin, coarse fibre, salads, raw high fibre vegetables and fruits, hot gravies, pastries and cakes.

High Fibre Diet: High fibre diet is given in conditions of atonic constipation when the muscles lining the gastro intestinal tract have lost tone. High fibre diet is given to provide sufficient amount of fibre to stimulate the intestinal mucosa and to provide bulk to the intestinal contents.

The normal diet is suitable for the correction of atonic constipation. The fibre content of the diet can be increased by using whole gram cereals, including raw fruits and vegetables,

in the form of salads, long fibred vegetables such as greens and stewed fruits and juices. The fluid intake should be increased to 2,000 ml. or more daily. It may be of help when patients are asked to take water before breakfast.

Highly refined foods and excessive seasonings are to be avoided.

High Calorie Diet: This diet is used in fevers, in diseases with high metabolic rate such as hyper thyroidism, following a prolonged or severe illness which has led to undernutrition.

The food allowance must provide sufficient calories to meet the total energy requirement of the body plus an allowance of 500 to 1,000 additional calories for storage of fat in the adipose tissue. This is a normal diet with an increase in the calorie levels to 3,000 or more. The amount of protein should be at optimum level. The amount of fuel foods, carbohydrates and fats is increased in the high calorie diet, the mineral and vitamin allowances should be maintained at an optimum level.

The amount of food that could be ingested at one meal should be determined and the rest of the calories supplied in a concentrated form. Excessive amounts of bulky, low calorie foods and fried foods may be avoided.

Calories in the diet can be increased by increasing the amounts of cereals and cereal products, potato, fat and sugar.

Low Calorie Diet: Low calorie diets are specially used in obesity for weight reduction because it is the only positive method of weight reduction. Low calorie diets are also important in diabetes mellitus, cardiovascular and renal diseases, hypertension and before surgery.

In reducing diets, the number of calories is decreased to the point where fat is no longer deposited in the tissues but the body is made to draw on some of its own fat stores to meet energy needs. A gradual loss of 6 to 8 pounds or 3 to 4 kilograms per month is desirable because drastic reduction in weight loss requires that the daily intake be reduced by 800 to 1,000 calories below the daily energy requirement.

Protein level must be optimum. Fats and carbohydrates are restricted to the calorie level of the diet. The foods selected should supply an adequate amount of minerals and vitamins or it should be supplemented.

To give a satisfied feeling, sufficient bulk should be included. Plenty of vegetables, fruits which are low in carbohydrate should be included. Concentrated sugars and fats must be restricted.

High Protein Diet : High protein diet is given during protein deficiency which results from inadequate intake of protein. Even if the diet is normally adequate, poor digestion and absorption as in the case of chronic diarrhoeas of any origin may induce deficiency. There might be excessive metabolism of proteins as in fevers, following surgery or wound healing of any type, following burns and in diabetic acidosis. Loss of protein from the body occurs in haemorrhage and burns. In hepatitis or inflamation of the liver, there is a failure to synthesize proteins in a normal manner and the requirement for protein goes high.

In degenerative disease of the kidney (nephrosis) and in chronic hepatitis (inflamation of the kidney) protein losses in urine, protein intake is increased. Sodium restriction is needed when there is marked edema.

All foods on regular diet with emphasis on dry and liquid milk, eggs, cheese, dhals, lean meat, fish and poultry can be chosen for high protein diet. Along with high protein diet if there is sodium restriction, regular milk, salted foods in cooking or at the table are to be restricted.

Protein Restricted Diet : The protein intake is restricted when there is hepatic coma which is a neurologic disorder which may occur as a complication in acute hepatitis or in cirrhosis. In chronic anaemia when the kidney function is reduced and waste products are not excreted properly from the body, there is retention of nitrogenous substances. A controlled diet with respect to protein, sodium and potassium is essential. Protein needs also to be restricted when there is acute glomerulonephritis.

The protein is restricted to 20-30 grams daily. The calories for maintenance should be derived from carbohydrates and fat to prevent burning of body tissue.

The diet may be of regular consistency, soft or liquid depending on the severity of the condition.

Legumes and nuts are to be avoided completely. The intake of milk, meat, eggs are to be limited. If the level of protein is brought down to 20 gm, milk, meat, eggs and sea-foods are to be omitted completely.

Carbohydrate Restricted Diet: In diabetes mellitus, a disease of metabolism characterised by lessened or complete inability of the tissues to utilise carbohydrate, the level of carbohydrate in diet is restricted. In this condition of diabetes there is sugar in urine (glycosuria), high sugar in blood (hyperglycemia) and there is excessive urination.

A measured diet and insulin dosage are carefully regulated that the blood sugar is kept within normal limits and the urine is free of sugar at all times. The most important consideration is the amount of total calories ingested. The diet varies according to whether the patient is obese, or normal weight or under-weight.

If the diabetic patient is obese, calories are restricted to bring down the weight to 5 per cent below normal. The ideal tune to consider insulin or oral tablets is when the weight has been brought down to 5 per cent below ideal weight but sugar still persists in the urine. A well balanced diet with minimum calories is needed to maintain weight. If sugar still persists in the urine then insulin or oral drugs are indicated. Underweight diabetics should be provided with enough calories to increase the weight to normal and they also require insulin to regulate blood sugar.

A diabetic benefits from a high protein, moderate carbohydrate and low fat diet. Extra vitamins of the B group are essential.

The diet is calculated using exchange lists, The following foods should be avoided in all diabetic diets—roots and tubers

sweet puddings and chocolates, fried foods, dried fruits and nuts, sugar, fruits like bananas, sapotas and custard apple.

Low Fat Diet: This is a normal diet modified to reduce the fat content to approximately 20 gram per day. It may be used in treating diseases with intolerance to fat such as gall bladder, liver and pancreatic diseases or in conditions of steatorrhoea. In obesity, fats are restricted to ensure low calorie level. In coliac diseases when there is intolerance to fat, fats are severely restricted.

Milk, eggs, lean meat, cottage cheese, egg white, bread and cereals, fruits and vegetables can all be included. The foods to be avoided are fatty meat, gravies, rich desserts, pastries, fried foods, free fat and cream. Strongly flavoured vegetables, legumes and melons are poorly tolerated.

Fat Controlled Diet: This diet is given when there is atherosclerosis which is concerned with thickening and loss of elasticity of the arterial wall. When the coronary artery is affected, it becomes fatal.

Cholesterol rich foods are avoided. Vegetable oils like sunflower, safflower, corn and cotton seed oils which have unsaturated fatty acids are included in the diet and saturated fats are avoided. Unsaturated fatty acids lessen the deposition of cholesterol in the arteries.

Foods rich in saturated fats like fats of meat, butter, hydrogenated fat, whole milk and whole milk cheese should be avoided.

Sodium Restricted Diet: This is a normal diet but with low sodium content. Sodium restricted diets are for the prevention, control and elimination of oedema in many pathologic conditions and occasionally for the alleviation of hypertension. Sodium restricted diets should be prescribed in terms of milligrams of sodium *eg.* 500 mg. sodium diet.

In very low sodium diet (250 mg. sodium diet), no salt is used in cooking. Careful selection of foods low in sodium is necessary. Milk must be avoided or low sodium milk is to be

included. This is used in cirrhosis of liver when there is accumulation of fluids in the abdominal cavity (ascites). In a 500 mg. sodium diet no salt is used in cooking and there should be careful selection of foods in measured amounts. Regular milk can be used. This level is used in congestive heart failure, in kidney diseases when there is oedema (accumulation of fluid) or cirrhosis with ascites. In 1,000 mg. sodium diet, no salt is used in cooking. This diet permits slightly higher protein level if required. Measured amounts of salt can be included. In mild sodium restriction, the sodium content may vary from 2,400 to 4,500 mg. This is used as a maintenance diet in cardiac diseases and renal disease.

Foods to be avoided are all salted foods, canned fish, meat, pickles, salted butter, bread, nuts, all foods to which salt or baking soda has been added in cooking, spinach and other green vegetables (except cabbage), carrots, pink raddish, knol khol, cauliflower, french beans, jackfruit and ripe banana.

Exercise

1. Define therapeutic diet. Explain light diet, soft diet, liquid diet and clear fluid diet.
2. Describe high protein diet, low fibre diet, low caloric diet and fat controlled diet.
3. Visit nearby hospitals to observe various deficiency and disease conditions and diet therapy followed to rectify them.

3. FOOD ADULTERATION

Good food denotes not only a nutritionally balanced diet but also wholesome and safe food. Goods and services are harder to judge and the common man today is left to the mercy of manufacturers and salesman. Foods of various kinds from the stage of wholesale to retail markets tend to get adulterated which is injurious to human health. What is food adulteration?

Food adulteration includes not only the international addition or substitution or subtraction of substances which adversely affect the nature of the substance and quality of foods but also their incidental contamination during periods of growth, harvesting, storage, processing, transportation and distribution. The former is a useful act on the part of the adulterator intended to deprive the buyer of his money's worth and thereby reap a large margin of profit. But incidential food contamination is usually due to ignorance, negligence or lack of proper facilities. When the adulteration involves contamination of a serious nature, the consequences will be grave. Adulteration in any form should be considered as a major public health hazard.

The important factors contributing to adulteration are

(1) The wide gap between demand and supply of food articles

(2) Temptation for quick gain

(3) Gullibility of people through ignorance, apathy, indifference and least resistance from the consumer's end

(4) Corruption among traders

(5) Lenience to traders in regard to enforcement of laws and food safety

Common Adulterants in Foods

Prohibited substances are either added to food or partly or wholly substituted in food, valuable components may be removed from the foods, the adulteration of food does not have a set pattern. The adulterant used generally mixes well with the major food article in colour, shape, size and appearance. The foods which are in demand are widely adulterated.

Foods commonly adulterated in India are the following:

(*i*) Milk and its products

(*ii*) Salted products

(*iii*) Cereals

(*iv*) Pulses

(*v*) Spices

(*vi*) Sweets and sweeteners

(*vii*) Edible fats and oils

(*viii*) Beverages

The following are the common adulterants present in them

Food Materials	*Common adulterants*
Cereals such as wheat, rice	Mud, grits, soap stone bits
Semolina	Sand, grits
Dals	Coal tar dyes, Kesari dal
Turmeric powder	Lead chromate powder
Zeera	Seed, mud
Dhania powder	Starch, cowdung or horse dung powder
Black pepper	Dried seeds of papaya
Chilli powder	Saw dust, brick powder
Sugar	Dirt, rava, fine white sand
Tea dust-leaves	Black gram husk, tamarind seeds powder, saw dust, used tea dust.
Common salt	Fine white sand
Butter	Starch, animal fat
Icecream	Cellulose, starch, non-permitted colours
Ghee	Vanaspathi

Effects on Health

The harmful effects of food adulteration are not perhaps as dramatic as those of food poisoning. But it cannot be also totally ignored since adulteration has slow poisoning effect.

Argemone poisoning has been repeatedly reported from several parts of the country due to adulteration of mustard and groundnut oil with argemone oil. Argemone poisoning leads to gastrointestinal disturbances, swelling of limbs and rash on exposed parts of the body and in a few cases death due to cardiac arrest.

Excessive intake of kesari dhal has lead to permanent paralysis, cheap varieties of dhal or besan are mostly adulterated with kesari dhal, lead chromates mixed with turmeric (haldi) powder could lead to stiffness of limbs due to lead poisoning. Coal tar dyes and non-permitted colours could be mixed with edible oils which causes cancer. Large number of people have been affected in the past due to consumption of liquor adulterated with methanol, in serious cases death results.

Legal Checks Against Food Adulteration

It was considered that an Act on All India basis would serve better in checking the adulteration than the various state governments laws. In 1954 Government of India promulgated Prevention of Food Adulteration Act (PFA). The prevention of Food Adulteration rules were passed in 1955. A Central Food Laboratory established under the act is located at Calcutta for the purpose of reporting on suspected food products. A Central Committee for Food Standards has been constituted under the act and has been charged with the function of advising the Central and State Governments on matters relating to the act. Food inspectors are appointed by State Governments.

The operational part of the enforcement of the law is the direct responsibility of the State Governments and local bodies. Each State Government has one Central Public Health laboratory with public analysis lab and analyst.

Samples are collected by Food Inspectors and adequate amount of sealed samples are sent to the Regional Public Health Laboratory for analysis. On the basis of the analysis report, the trader is prosecuted and depending on the severity of offence, imprisonment or fine follows. The report of the Public Analyst is not final. Samples under dispute will be referred to the Director of the Central Food Laboratory whose report will be final. Apart from general standards of limits for the purity of foodstuffs, the act has laid down standards for the limits of poison element, antioxidents, colours, preservative and stabilising agents.

People must be made aware of the dangers of adulteration and how to check them.

Exercise

1. List the common food adulterants and explain their harmful effect on health.
2. Visit to the food testing laboratories to study the detection of adulterants in food.

4. FOOD PRESERVATION

Preserving food in simple terms means keeping it safe from decay. Decaying is a natural process which makes all types of food decay sooner or later. Various methods for preserving foods, based on techniques which eliminate moisture and other factors causing food spoilage have been devised and practised in Indian homes from ancient times. However, they are mainly confined to the preparation of pickles, chutneys, murabhas, papads, dried fish, dried meat, dehydrated vegetables and fruits. The average housewife is yet to know the numerous other methods available for food preservation.

For purpose of food preservation, foods are classified as perishable, semi-perishable and non-perishables. The perishable foods are juicy fruits like tomatoes, mangoes, papaya, peaches and plums and juicy vegetables like cucumber, snake gourd, bitter gourd etc. These foodstuffs have a high moisture content and are highly susceptible to spoilage. The 'semi-perishable' foods have much less moisture content. Beet roots, carrots, peas, beans, cluster beans, pumpkin and apple fall in this group. The 'non-perishable' foods have a very low moisture content. They are matured foodgrain cereals, pulses and nuts and are not easily susceptible to spoilage by micro-organisms and enzymes.

Causes of Food Spoilage

Food spoilage occurs due to physical means *(e.g.)* mishandling of foods, chemical means *(e.g.)* enzymes and non-enzymatic

brewing, microbial means due to bacteria, yeast and moulds and due to macroanimals like rats, dogs etc., and due to insect infestations such as cockroaches, beetles etc. and lastly due to metallic contamination. Of all the types of spoilage, microbial spoilage ranks first.

In bacterial spoilage, carbon dioxide is released and the swelling takes place, sour taste, change of flavour and turbidity also develop in the spoilt food. Further certain toxins are produced in canned vegetables.

Yeasts are tiny organisms not visible to the naked eye, but can be seen through the microscope. They multiply very fast. Yeasts cause fermentation action of certain components of the perishables. During yeast fermentation, the sugar present in a particular food is broken up to form alcohol and carbon dioxide. Most of the fruits and vegetables contain sugar.

The moulds are in the form of threads developed in the perishable foods. They are easily visible to the eye. The spoilage caused by them is only on the surface.

All the above micro organisms need optimum moisture and temperature conditions for multiplication. They are sensitive to heat. Therefore one of the effective methods of killing them is heat sterilization or by exposure to ultra violet rays. Spoilage caused by temperature conditions can be reduced by maintaining the humidity of the storage place or by dehydration. Spoilage of biscuits and fried foods, drying and tilting of vegetables, staleness of bread and hardening of sweets are all due to changes in moisture content.

Light accelerates rancidity in fats and loss of riboflavin and vitamin C in foods. Deterioration caused by light can be prevented by storage in dark places, opaque packing and light proof rooms. Oxygen increases the rate of development of rancidity, with its associated unpleasant flavours and harmful chemical changes. Oxygen can be removed from foods by heating and sealing.

Enzymes are catalysts present in foods and vegetables. They cause food spoilage due to chemical reaction. Because of such reaction, an apple becomes brown immediately after it is cut and tomato sauce develop a black scum. Enzymes are sensitive to heat and are easily destroyed by heat. Therefore, enzyme activity can also be prevented by heating to temperatures which inactivate the enzymes by cooling (as in freezing and refrigeration), by eliminating the air, by protecting from light and by the addition of anti-oxidants.

Rodents and insects besides consuming the stored grains also leave their excreta causing damage to quality of foods. When food gets contaminated with metals like zinc, lead and arsenic which may result due to contamination brought about by insecticidal sprays or by contact directly with the metal, they bring about spoilage and poisoning of food.

Methods of Food Preservation

Food preservation can be classified into 'temporary preservation' in which micro organisms are suppressed, and 'permanent preservation' in which micro organisms and enzymes are destroyed completely. Cold storage, freezing and addition of chemical preservatives sugar, salt, spices, vinegar are all temporary preservation methods, high temperature alone or in combination with acid and salts, is a permanent method. The different methods of food preservation are:

(i) Drying and Dehydration

(ii) Use of chemical preservatives

(iii) Use of micro-organisms which inhibit the spoilage types

(iv) Use of high temperatures

(v) Freezing and cold storage

(vi) Freeze drying

(vii) Irradiation

Whatever method is used, cleanliness and general sanitary conditions are important. Every effort should be made to avoid

contamination of food by dust, laddle air, dirty utensils, soiled work surface and hands.

(i) Drying and Dehydration: Drying is the oldest method of preserving foods for future use. Drying removes water from food and organisms are unable to grow without water. Thus drying keeps away moisture (which causes spoilage).

Our ancestors dried beans, peas and many other vegetables, fruits, meat and fish by spreading them in the sun and in dry warm places. They used salt, turmeric and other condiments to facilitate preservation and improve the taste and appearance. In many farm houses, open spaces and lofts can be seen full of dry foods. Drying can be applied to raw, half boiled or fully boiled foods. It causes considerable changes in flavour and food values. Recently a number of dried convenience foods such as corn flakes, noodles, milk powders have come into market making the people aware of the advantages of dehydration.

Dehydro-freezing is a recent method of preserving dehydrated foods in a frozen state. This is different from dehydrated foods as they are stored in a dried condition.

(ii) Use of Chemical Preservatives : Salting is still practised for preserving meat, fish, vegetables and for making pickles. Several anti-oxidants are available for preserving fats. Salt, sugar, nitrates, vinegar, Citric acid, woodsmoke, alcohol, potassium metabisulphite, benzoic acid and sodium benzoate are the commonly used substances for preservation. Addition of sugar and citric acid is practiced in the preparation of jams, jellies, marmalades and murabhas. Nitrates are used for pickling of meat. Vinegar helps in the preservation of sauces and pickles. Woodsmoke is an ancient method of preserving dried fish and meat. Potassium metabisulphite and sodium benzote are commonly used for the preservation of juices, squashes, cordials, ketchup etc.

(iii) Use of Micro-organisms : A most convenient type of preservation by means of micro-organisms is the fermentation of

milk sugar lactose by lactic acid bacteria, which are widely distributed in nature, to set curds and cheese. Another type of fermentation occurs in fruit juices which is caused by yeast, as in the production of vinegar and alcohols such as wines, beer, brandy etc. Micro-organisms are also used as leavening agents in bread making and oriental fermented foods such as idli and appam. Sauerkraut is a commonly used item in western countries which is nothing but salted fermented and shredded cabbage. This can be preserved for a long time. Cucumber pickles are prepared by a fermentation process like that of the preparation of Sauerkraut.

Any raw material, like grass, the stalks and leaves of crops, sugarcane etc., is cut into small pieces and packed tightly in a 'silo' which may be a pit in the ground or a large container. Fermentation is brought about by certain bacteria that are present in the materials and the silage that formed is used as fodder for cattle.

(iv) Use of High Temperature: This includes methods such as cooking, pasteurisation and canning. By cooking we kill the micro-organisms but the cooked foods cannot be kept for a longer time. Pasteurisation is meant for liquid foods like milk and fruit juices where the pathogenic micro-organisms are killed at a temperature below the boiling point of water. Even pasteurised foods cannot to be kept for a long time. In canning, foods are heated to kill spoilage micro-organisms and to inactivate enzymes and sealed immediately in air tight containers to prevent subsequent contamination and processed at higher temperatures. It is a suitable method for preserving any food which is acceptable in moist form.

(*v*) *Freezing and Cold Storage:* Freezing and cold storage employ the same principle of low temperature preservation. But the temperature ranges are different. In freezing the water in food is frozen. But in cold storage it remains as such. Frozen foods can be kept for a very long time than foods that are refrigerated (cold stored). Foods preserved by freezing resemble very closely to that of fresh foods in appearance, taste and food values.

(vi) Freeze Drying: This technique comes under freezing. Here freezing is done first and then the foodstuffs are dried. As a result the ice cystals formed in the foodstuff while freezing gives a solid appearance to the food. Then frozen foods are kept in vacuum drying ovens where they are dried. In this process the ice gets sublimed, and becomes vapour without becoming liquid. This is known as sublimation. After this the products are taken and then packed. The product will not reduce in volume but the weight will be reduced. The material will be porous in nature and so will dehydrate very quickly and retain its structure well. Packaging difficulty is found in this type of preservation where the structure of the foodstuff is not damaged.

(vii) Irradiation: This is of a recent origin where the electronic rays are utilised for the preservation techniques. Foodstuffs are exposed to a certain amount of radiations where the micro-organisms can be killed. This technique is used to prevent the spoilage due to micro-organisms and also sprouting in potatoes. The process is otherwise known as 'Cold Sterilization' because without raising the temperature of the foodstuff, micro-organisms are killed. But the amount of radiation exposed should be accurate and safe so that no harmful effects to the humans who consume the irradiated foods should result.

Exercise

1. How does food spoilage occur? List the methods of food preservation.
2. Describe freeze drying and irradiation.
3. Do projects in preservation of vegetables and fruits—pickling, drying, preparation of jams and jellies.

5. FOOD BORNE DISEASES

Communicable Diseases

There are over sixty diseases. They may be contracted and of these some twenty five are associated with food. The causal organisms reach the new host in a number of ways:

(*a*) Direct or indirect transmission from a sick person or a carrier. The latter may be convalescent or a replaced case or completely symptomless, this being particularly dangerous in one who handles food.

(*b*) By consumption of food or water contaminated by animals or insects.

(*c*) By consumption of food (including milk) from diseased animals.

These in turn, can be prevented by strict observance of the requirements of environmental and personal control.

Human Transmission

(*a*) Isolation of the patient while infectious, and treatment of infectious discharges. These consist largely of droplet infection from mouth and nose, and infection carried in the excreta. A prolonged test of cure is advisable in any of the intestinal diseases before release of the patient, especially in the case of food-handlers.

(*b*) Protection of personnel treating the patient, by use of protective gowns (garments), masks, ventilation and voiding of discharges into prepared containers which are disinfected.

(*c*) Disinfection, where necessary, of the room furnishing bedding and objects handled by the patient, after his recovery.

(*d*) Strict personal cleanliness.

Transmission by Water

(*a*) Protection of water sources by proper sewage disposal.

(*b*) Purification of the water supply.

(*c*) Protection of this protected water subsequently.

Transmission by Food

(*a*) Supervision of the conditions in which food is produced, carried or stored. This includes the place, its equip-

ment and its services, and any personnel or animals involved.

(*b*) Periodic inspection of all foodstuffs, and elimination of any suspicious item.

(*c*) Pasteurization of all milk and dairy products.

(*d*) Protection of food from contamination by handling animals or insects and its retention in suitable conditions.

(*e*) Sanitation of premises and equipment.

Transmission by animals or insects

(*a*) Prevention of entry to any food premises.

(*b*) Control of breeding places.

Amoebic dysentery (Intestinal infection by a protozoa.)

The incubation period varies from 5 days to several months but is usually some three weeks. Symptoms range from a mild discomfort to acute diarrhoea with blood and mucus. The infection may subsequently extend to the liver, lung or brain. Cysts of amoeba are evacuated with the faeces and contaminate vegetables or water. Flies or soiled hands also act as vehicles of transmission.

Prevention is by the sanitary disposal of excreta and the care of water supplies. The drinking water, if suspect, should be boiled as chlorination does not kill the cysts. Strict personal hygiene should be observed especially by food-handlers. The food should be protected from flies, and all vegetables and fruit eaten raw should be washed and disinfected.

Bacillary dysentery

This is a bacterial infection characterized by fever and diarrhoea, with blood and mucus present. The incubation period is 1—7 days but is usually three.

It is transmitted by contaminated food, water or milk, flies or soiled and unwashed hands, and is prevented by the sanitary disposal of excreta and the care of water supplies; the sanitary

handling of food, especially if eaten raw; pasteurization of milk; personal hygiene and the exclusion from food handling of any person with diarrhoea.

Brucellosis (Undulant fever)

This is an irregular fever with insidious onset. The symptoms are headache, weakness, malaise and pains in joints and back. The incubation period is 6-30 days. In animals, this leads to abortion.

The fever is transmitted by unpasteurized milk or dairy products from infected cows or goats, or from direct contact with the flesh of infected animals, and prevention is achieved by pasteurization of all milk and dairy products, elimination of diseased animals and inspection of all meat for consumption.

Cholera

Cholera is an acute intestinal infection of sudden onset with a mortality ranging from 10 to 80 per cent. Vomiting and diarrhoea are so violent that dehydration and collapse ensue. The incubation period is 1-5 days. The vibrio cholera, contained in faeces or vomit, contaminates water or food through the medium of soiled hands, utensils or flies.

Prevention is by sanitary disposal of discharges, care of water supplies, pasteurization of all milk, full hygienic preparation and serving of food and fly control. In an endemic area, vaccination of all personnel is essential.

Diphtheria

In this acute fever a grey membrane develops round the tonsils. The incubation period is 2-5 days. Milk which has been contaminated by a cancer has been known to serve as a vehicle in carrying the infections.

Prevention is by pasteurization of milk and immunization in childhood.

Enteric fever

In this term are included both typhoid and the three paratyphoid fevers. They are systemic infections with incubation

periods varying widely between 3-30 days, but they usually demonstrate in the second week. The symptoms differ markedly but include fever, enlargement of spleen, rose spots on the trunk and diarrhoea.

Transmission is by food, especially uncooked shellfish or vegetables, water or milk, chinaware or utensils contaminated by hand or by flies, and from faeces or urine of an infected person or carrier. The latter, a healthy person who harbours the bacteria in the alimentary canal and discharges them freely, may not be aware of the condition and is of considerable importance.

Preventing measures are: Ensuring the purity of the water supplies and the sanitary disposal of excreta; pasteurization of milk and milk products; seeing the shellfish are obtained only from approved sources; fly control; strict hygiene of the person and of the preparation and serving of food; making certain there are no carriers among the food handlers; immunization of personnel generally and isolation of patients until they are bacteriologically clear of disease.

Infective hepatitis

This is an acute infection with early symptoms of fever, loss of appetite, nausea, fatigue, headache and abdominal discomfort. Later, jaundice may appear, with signs of liver damage. The incubation period varies from 10 to 40 days and is usually about 25 days. The causative virus passes in the blood and faeces of an infected person, and epidemics have been related to contaminated water, milk and food. Respiratory spread is also possible.

Prevention is by sanitary disposal of faeces and of respiratory discharges, care of the water supply, pasteurization of milk and personal hygiene.

Lepto spirosis

An acute virus infection, leptospirosis is characterized by fever, malaise, headache, vomiting, generalised pains and

conjunctivities. The incubation period is about 10 days but may range a week either way. It normally lasts some three weeks but relapses can occur.

The genus leptospira is found in the urine of cattle, swine, dogs, rats and mice, and this in turn, may contaminate food and water. Transmission is usually by penetration of the skin while bathing in contaminated waters, or at work. It may also be incurred by drinking or eating contaminated water or food; or by direct contact with diseased animals or contaminated food supplied by fishmongers, or in those working in wet, poorly drained places where rats are plentiful.

Preventive measures are: Control of rodents and domestic animals; care for the purity of drinking water; protection of exposed workers by boots and gloves; avoidance of swimming in contaminated areas; disinfecting the urine of patients.

Poliomyelitis

An acute febrile illness with a headache and stiff neck. In a proportion of cases flaccid paralysis develops in a few days, and may tend to improve later. The virus can be isolated from the faeces but may be passed by direct contact or droplets from the nasopharynx. Milk has been shown to be a vehicle. No reliable evidence exists as to the role of other food, water, insects or sewage, though flies and sewage have been found contaminated.

Prevention is by continuing the usual personal, water and food hygiene, and fly control; using only pasteurized milk; isolating cases with concurrent disinfection and immunization.

Streptococcal infections

Streptococci of a certain type are responsible for a number of conditions, including, septic sore throat and, if the patient is not immune to the toxin in the bacteria, scarlet fever. The incubation period for both is 2-5 days, with sudden onset of fever, sore throat with swollen tonsils, headache and malaise and in the case of scarlet fever, the typical rash and facial appearance.

Transmission is normally from nasal carriers passing the infection by droplet spread through the air, infected floor dust or indirectly, through objects handled. Milk and other food may be contaminated, giving rise at times to explosive outbreaks.

Prevention is by pasteurization of milk, exclusion of infected persons from food-handling, strict personal and food hygiene, isolation of cases and daily surveillance of contacts.

Tuberculosis

Bovine tuberculosis, usually manifesting itself in the lymphatic gland, central nervous system, bones and joints, kidney etc., is usually acquired by ingestion of milk or milk products from infected cows, by handling contaminated animal products, or by airborne infection in barns. Pulmonary tuberculosis, though almost entirely passed by droplet infection or long personal contact, has also been known to have arisen from the use of contaminated utensils.

Prevention is by pasteurization of milk and milk products, and the elimination of tuberculosis among dairy cattle. Meat inspection is important for the condemnation of infected carcasses. Cases with open tuberculosis should be isolated, sputum, and articles soiled therewith, and all eating utensils and crockery disinfected. Personal and food hygiene are also necessary.

Vincents disease

This is a condition of the throat which is accompanied by fever, malaise and pain. The incubation period is 1-2 days. It can be transmitted by the use of improperly washed utensils or of communal drinking vessels.

Prevention is by sterilization of all utensils and crockery and avoidance of public drinking.

Exercise

1. Write the precautionary measures to be taken to prevent foodborne diseases.

2. What is amoebic dysentery? How will you prevent it?
3. Write about infective hepatitis.
4. Give the cause, symptoms and prevention of strepto-coccal infections.

6. WEIGHTS AND MEASURES

A recipe usually tells how much of each of several ingredients to be used. One should know the weight of ingredients to be used and correct measures. This will help in getting exact recipes possible and tends to assume success because the quantity measured is more uniform.

One should have a knowledge of abbreviations of units of measurement, measuring equipment equivalents and how to measure ingredients properly to make the receipe a success.

Abbreviations

Length :

centimetre—cm
foot—ft
inch—in
metre—m
millimetre—mm
millimicron—mc

Temperature :

degree Centigrade—°C
degree Fahrenheit—°F

Time :

hour—hr
minute—min
second—sec

Volume :

bamel—ba
bushel—bu
cubic centimetre—cc
cup—c
fluid—fl
gallon—gal
hectolitre—hl
millilitre—ml
ounce—oz
pint—pt
quart—qu
peck—pk
standard spoon—S
Table spoon—T
tea spoon—tsp

Weight :

gram—g
kilogram—kg
microgram—mcg
milligram—mg
ollack—o
ounce—oz
pound—p

Units of measurement

Volume—when measurement for cookery is done by volume, the basic unit is the fluid ounce. Fractions of ounce are measured by spoons.

The Home Science Association of India has brought out standard cups and spoons for effective measurement of fluids and dry ingredients. Dry ingredients must be measured first if the cup is also being used for liquids. Diagram of standard cup and spoons.

Conversion Tables

Standard cup	*Standard spoon*	*Contents* (ml)
1	50	250
4/5	40	200
3/5	30	150
1/2	25	125
2/5	20	100
1/5	10	50

IC = 250 ml. water
IS = 5 ml. water

For practical application, the following method has been found useful with small quantity recipes.

For the 8 oz cup measure IS cup and scoop out 2½ standard spoons per each cup of ingredient in the recipe. If the recipe

calls for 10 oz cup, add to each standard cup 3/4 standard spoons of the same ingredient.

Measures	*Equivalents*
1 cup	16 tea spoons or 1/2 pint
2 cups	1 pint
4 cups	1 quart
4 quart	1 gallon
1 ollock	7/8 cup
1 litre	1,000 cc

Weight

Weight measurements are frequently used, they are based on the gram because the metric system of measurement is used.

Weights	*Equivalents*
1 kilogram	1,000 grams
1 ounce	28.4 grams
1 pound	454 grams
1 fluid ounce	30 cc
1 gram	1,000 milligrams
1 milligram	1/1,000 grams or 1,000 micrograms
1 microgram or gramma (r)	1 millionth gram or 1/1,000 milligram
1,000 grams or 1 kilogram	2.2 lb.

Graduated dry measuring cups (1, ½, ⅓, ¼ cups)

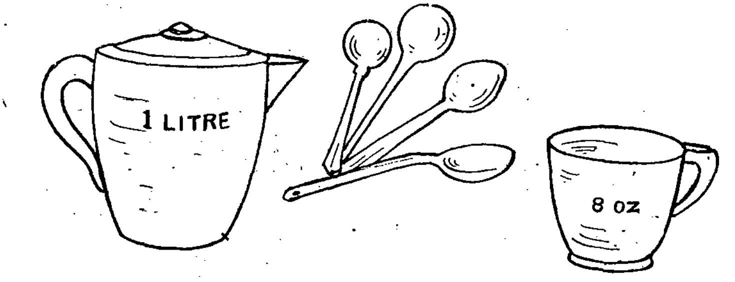
Besides the Home Science standard cup, graduated dry measuring cups or fraction of cups for measuring any dry ingredients or shortening are available.

Liquid measuring cups

Measures may be transparent glass or plastic with inscribed marks. The number above the one cup line is noted to prevent spilling.

Measuring spoons: (1 tbsp, 1 tsp or ½ tsp)

Measuring spoons are used for less than one-fourth cup of any ingredient.



Liquid Measuring cup Spoons Cup

Fig. 13. Standard Measuring Equipments

Methods of measuring ingredients

Flour: For measuring, flour should be sifted once and then lightly spooned into a dry measuring cup to overflowing. The excess is levelled with a straight-edged spatula. The cup should never be tapped to level the flour; tapping packs down the flour and results in more than the required amount.

Sugar: Sugar does not require sifting before measuring unless it is lumpy. White sugar is spooned into a measuring cup and made level with a straight edged spatula. If brown sugar is lumpy, crush lumps with a rolling pin or press through a coarse sieve. Brown sugar free of lumps should be packed firmly into a dry measuring cup so that it will retain the shape of the cup when it is turned out. Use a straight-edged spatula to make the brown sugar measure level. Confectioner's sugar tends to lump and may require sifting before measuring. It is lightly spooned into a dry measuring cup without tapping, and the measure is made level with a straight-edged spatula.

Shortening: Shortenings should be at room temperature when measured. Solid shortenings are pressed firmly into a dry measuring cup so that air spaces will be avoided. The measure

is made level with a straight edged spatula. Remove the shortening carefully from the cup so that none is left clinging to the sides.

Butter and margarine wrappers are often marked with table spoon or fractional cup measures. When approximate measures of butter or margarine are required the portion may be cut through the wrapper at the desired mark. Liquid shortenings such as salad oil or cooking oils are poured directly into the liquid measuring cup upto the desired level.

Liquids: Liquid ingredients are measured in a standard liquid cup with a rim above the one cup mark. The cup is set on a level surface before pouring the liquid. Be sure to check the measuriug line at eye level.

Dry ingredients: Dry ingredients such as baking powder, soda, salt, cornstarch, cream of tartar and spices are stirred first to break up lumps. With the standard measuring spoon, dip up an overflowing spoonful. and level it with a straight edged spatula.

Eggs: The eggs should be beaten with a fork or a wire whisk until the white and yolk are blended. Then pour the beaten eggs into a liquid measuring cup to the desired mark. Remember to look at the cup at eye level.

Other ingredients: Ingredients such as shredded coconut, nuts, chopped dried fruits and soft bread crumbs are lightly pressed into a measuring cup until level with the top of the desired graduated dry measure.

Exercise

Describe the methods of measuring flour, fat and liquids.

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CHAPTER III

HEALTH AND FIRST AID

1. PREVENTIVE MEASURES AGAINST WORM INFESTATION

Parasites are creatures that live in or on the bodies of other creatures and do them harm. In tropical countries, they are a common cause of serious human illness. Precautions must, however, be taken and there is always danger that travellers will bring a parasite that does not usually live here. Parasites may be external—living on or in the skin such as lice, scabies, mite, fleas and bed bugs or internal—living in the body such as thread worm, round worm, hook worm, tape worm or guinea worm.

We will consider here preventive aspects of internal parasites.

Thread worm: Man is infected by swallowing the eggs. An already infected person can be reinfected by (1) contaminating his fingers with the eggs from his own perianal region and transferring them to his mouth and (2) the eggs hatching out in the perianal region and the larva crawling back up the anus into the colon.

Other people can be infected by (1) contaminating their fingers with the eggs, (2) becoming infected from lavatory seats and (3) by swallowing eggs—shaken out of clothes and bed clothes. It is common to find several members of the family infected.

Prevention is by (1) careful washing of anal region and hands after having the bowels open, (2) Frequent washing of bed clothes and under clothes and the exposure of them to wind and sun, (3) Cleanliness of lavatory seats.

Treatment is by piperazine citrate or gentian violet.

Roundworm: The eggs pass out of the anus. They are very resistant. In damp earth they can live for atleast five years. Ordinary sewage treatment does not always kill them. Infection of man is through his mouth.

Prevention is by careful hygiene, the sanitary disposal of human excreta, training of children not to eat sweets that have dropped to the ground and treatment of infected soil by deep burial or exposure to steam.

Ring worm: Ring worm spreads through fingers. Different varieties may affect head, skin, body and nails.

Particular care should be taken to avoid infection being conveyed to others. All toilet utensils, soap, towels and especially brush and comb should be kept separate. The child should sleep alone and should be as far as possible isolated from other children. He should be warned not to touch his head with his hand. If finds difficult, hand is covered by a cotton cap which can be boiled. Ring worm of the body varies in appearance. The ring worm of nails is characteristic with finger nails. The treatment of ring worm is oral administration of artificial antibiotics.

Hook worm: Hook worm is common tropical infection. There are two varieties Anhylortima deuodenal and Nector amaricans. The adult worm attach themselves by their hooks to the wall of the small intestine, their eggs being excreted in the faeces. People particularly liable to be infected are those who walk bare footed and handle faecally contaminated soil. Common evidences of infection are severe hypochromic microcytic anaemia, malnutrition and itching at the site of invasion of the skin.

Prevention

Tape worm : The eggs die unless they are eaten by cattle, which can happen when cattle graze pastures infected with human faeces or sewage. Once swallowed, the embryos appear from the eggs, pass through the intestinal canal, invade the tissues and settle down in striped muscle.

The preventive means include (1) obstinance from eating raw or imperfectly cooked pork, beef or fresh water fish, (2) sanitary disposal of human excreta, (3) careful personal and community hygiene, (4) thorough meat inspection, and (5) special precautions, where dogs are involved e.g. disinfection by D.D.T. deworming, care that dogs cannot get near food, crockery and children.

Guinea worm: Prevention of this disease depends on protecting drinking water from being infected by guinea worm patient. The cyclops (water fleas) are killed by heating the water or by adding a trace of potash. Wells and tanks which are approached by steps are the greatest sources of infection. There should be an arrangement for drawing water either by a pump or a bucket. The wells should be properly protected by a parapet. Barkel fish feed voraciously on cyclops and larvae of guinea worm and these may be introduced in tanks and wells with advantage. Simple straining of water through a cleanliness is often helpful.

2. FIRST AID

First Aid is such skilled assistance given in case of accident or sudden illness, as will preserve life, promote recovery and prevent the injury or illness becoming worse until medical aid has been obtained. It is rendered by a skilled person trained in methods of first aid.

Everyone should be educated in first aid skills to enable them to offer it on the spot, in the proper manner to the victim preventing further deterioration in his condition till the medical help arrives.

First aid has to be rendered without delay. Hence, it becomes necessary to have a first aid kit ready on hand.

A first aid box should contain:

1. A hot water bag
2. Cotton wool
3. Sterilized dressing
4. Rother bandage
5. Plaster
6. Scissors
7. Forceps
8. Soap
9. Set of splints
10. Medicine for snake bite
11. Iodine
12. Dettol
13. Spirit lamp
14. Constrictive bandage (rubber)
15. Sodium Bicarbonate
16. Smelling salt

First Aid is called for in case of:

(a) Burns and scalds

(b) Wounds and Haemorrhage

(c) Unconsciousness or fainting

(d) Poisoning including snake bite

(e) Fractures

(f) Drowning, Asphyxia

In all such cases an immediate rendering of the first aid will save the victim. But hasty action may prove to be dangerous. It is necessary to get trained in the different steps to be followed in rendering first aid.

Observation of the condition of the patient

(a) Is there haemorrhage? From where?
With what force? Of what colour? What quantity?

(b) How does the pulse beat? At what rate?

(c) What is the nature of breathing?
Is it visible? Is it with difficulty? Is it slow?

(d) Has the body turned blue?

(e) Are there wounds? Is it warm? Has any bone been broken?

(f) If the pulse cannot be felt keep your palm on his chest and observe the heart beat.

(g) Keep the patient comfortable till the doctor arrives.

(h) See that the patient gets plenty of fresh air. Keep the crowd away.

(i) See that the patient is not direct in sunlight.

(j) Loosen the garments if tight.

(k) Keep the head and body on the same level and keep the legs slightly elevated.

(l) Keep the patient warm. It prevents shock. See he does not sweat.

(m) The details of the accident and the first aid rendered should be communicated to the doctor through a messenger to summon medical aid without delay.

(n) Don't allow the patient to move. It may aggravate the effects of wounds or result in further loss of blood. Give the patient time to recover from the shock.

(o) Don't give water or any beverage while the victim is unconscious. It may result in chocking.

(p) Before giving stimulants like tea ascertain that the stomach is not affected.

Rendering First Aid in certain accidents

(a) Shock: Shock occurs when the body and mind get exhausted; they may not be able to carry on their functions properly.

Shock occurs in the following cases:

1. Loss of blood
2. Fracture
3. Gun shot wounds

4. Snake bite.

5. Poisoning.

6. Chest or brain injuries.

In all such cases the victim should be treated for shock.

Symptoms of Shock

A feeling of weakness, fainting, nausea, giddiness, pale skin, numbness of face and limbs, wetness associated with sweating, dilation of pupils and dimness of sight, pulse either quick or weak and affected breathing indicate shock.

Shock should be treated for with due consideration for the cause. If the shock is severe, the patient should be hospitalized immediately.

(b) **Haemorrhage** (Bleeding)

Wounds cause bleeding. Germs may enter the body through open wounds. Hence,

1. With clean hands press the bleeding spot to stop bleeding.

2. Heat a clean cloth over the flame to sterilize it, and keep it on the bleeding spot for ten or fifteen minutes holding it tight.

3. After five or ten minutes loosen it to see if the bleeding has stopped.

4. If the bleeding had stopped apply another clean cloth over it and fasten it tight.

5. Observe the bleeding spot now and then, if the colour deepens apply pressure again.

6. Keep the bleeding spot slightly elevated.

7. Send for medical aid without delay.

For Burns

A most unusual emergency is a call to deal with a person whose clothing is on fire. In the standing position there is a considerable likelihood that the flames may be fanned by the draught resulting from the blast itself. The flames will spread much less rapidly if the person is laid flat on the ground. Pull of any clothing that admits of it, and wrap the subject in a jacket, or better still, roll him in a rug, blanket or carpet, if such is available, so as to smother the flames. Once they are extinguished, dealing with clothing becomes the immediate problem. Cut away all those portions that are not adherent to the body surface; these should be left in position, to be removed in hospital.

One of the most dangerous results of severe burn is shock. The severity of this varies with the extent and the depth of the burning. Prompt treatment is essential. Keep the patient warm and give a hot sweet drink. Cover the burns with a dry clean towel and take the patient to hospital at once by ambulance. Only small and superficial burns should be treated at home and even these need care. Oily substances especially collect and harbour dirt and germs and as all burns are liable to infection, such greasy dressing should be avoided at all cost. Bicarbonate of soda is to be found in almost every house, and is very soothing. It is not open to any of the foregoing criticisms. In a strength of two teaspoons to a pint of warm water, a solution of bicarbonate of soda may be applied as a dressing to any small burn.

Treatment of shock and covering the burn with a clean towel alone is the province of first aid.

Shock

Shock may follow operation, prolonged haemorrhage, severe burns, or acute exhaustion from any cause. The patient is pale and sweating, his hands and feet are cold, his life livid, his pulse rapid and feeble, his breathing shallow. Send for the doctor and get the patient into bed at once, rolling him in warm blankets and packing him around with hotwater bottles. Tilt up the foot of the bed for resting the legs on wooden blocks to

a height of five to six inches. In shock much of the blood collects in the large abdominal blood vessels and comparatively little is left to carry on the general circulation; by tilting the foot of his bed you help the blood to run back towards the heart. Give the patient a hot sweet drink of tea or coffee. When the doctor comes he will tell you what additional treatment is necessary.

Drowning

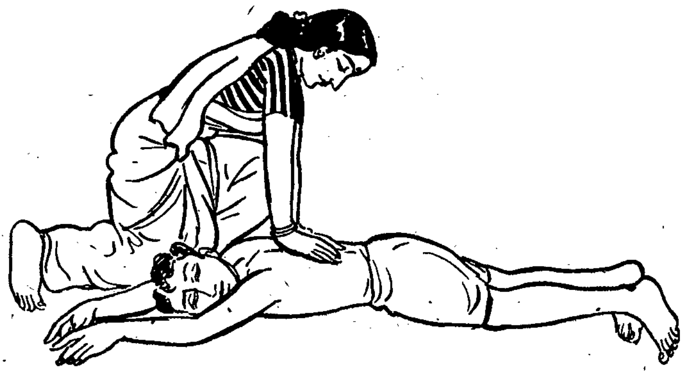
'Prevention is better than cure'. If every boy and girl had learned to swim well, fatal cases of drowning would be comparatively rare.

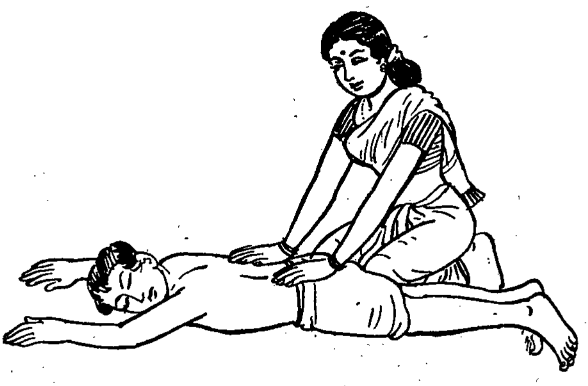
Death by drowning is death from suffocation by water. Consciousness is lost before death occurs and if the air passages can be cleaned and oxygen in the form of fresh air, introduced into the lungs in time, the apparently drowned person will recover. Every second is of value; there must be no delay in endeavouring, first of all, to re-establish respirationon the spot. Since natural breathing has ceased, similar movements of the chest and lungs must be produced by means of what is called 'Artificial Respiration'.

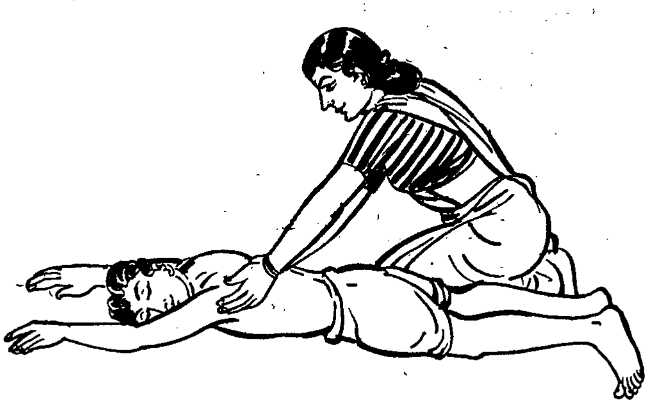


Fig. 14-A. Artificial Respiration

The sufferer should be out of water as quickly as possible and carried to some dry and sheltered spot (if close at hand). Clothing about the throat, chest and abdomen should be loo-







Figs. 14-B, C. & D. Artificial Respiration

sened and his mouth and throat rapidly of mud, weeds etc. by the finger and a handkerchief. He should then be rolled over on his face, his head turned to one side, his tongue drawn forward and a piece of wood or tightly twisted corner of a hand kerchief thrust between the teeth on one side of his jaw, to keep the mouth open. Start at once artificial respiration.

When natural breathing has been fully established, the patient should be put to bed between warm blankets, with hotwater bottles to the feet and arm pits. So as soon as the patient can swallow, a cup of hot tea may be given with advantage. Alcoholic stimulants unless specially ordered by the doctor, are better avoided.

In every case of apparent death by drowning, the movements of artificial respiration should be steadily preserved with as long as there is any hope of recovery. In several desperate instances, life has been restored after many hours by this means.

Fainting

Fainting occurs whenever the heart does not send to the brain enough blood to enable it to go on doing its work properly. The lessened blood supply to the head is shown by the increasing pallor of the sufferer's face and when the brain receives so little blood that it is no longer able to control the muscle which hold the body upright, the latter cease to do their work and the individual falls to the ground unconscious.

It is easy to see that a weak or tired heart can less easily pump blood to the head when the person is standing erect than when he is lying flat and that the blood will reach his brain more easily if the head be placed lower than any other part of the body. Hence, one can understand that the best way to prevent fainting when this is threatened and to restore to consciousness, persons who have fainted is to lay them down flat on the ground or on a couch (not placing a pillow under the head), near an open window and to loosen all the clothing about the neck, chest and waist—so that there may be no obstacle to the free movement of both heart and lungs.

Many people think that when a person has met with an accident or is feeling faint or ill, the first thing to be done is to give some stimulant such as brandy or whisky. This is not wise and in some cases, as when there is bleeding, for instance, may only make matters worse. Any ordinary hot drink such as tea, coffee, hot milk (or even plain hot water) will be useful if there is faintness or shock, but as a rule stimulants should only be given at the express bidding of a doctor.

When the occupants of a room complain of faintness, the reason may be defective ventilation and this point is one which should always be remembered and attended to in such circumstances.

Convulsions

In the true epileptic fit, there is complete loss of consciousness, and there are usually convulsive movements, which may be extremely violent, but the sufferer should not be forcibly held down. A pillow or folded coat should be placed beneath the head to save it from injury. The clothes should be loosened, especially about the chest and waist and a piece of wood, the corner of a small branch, a cork, a ruler or the handle of a walking stick should be held between the teeth to prevent the tongue from being bitten. The sufferer is generally very drowsy after the fit and should be allowed to go to sleep quickly in an airy darkened and quiet room, the body being well covered so as to maintain a comfortable warmth.

In hysterical fit, consciousness is not lost, there is apt to be something struggling, with screaming and shouting, laughter and tears. Sympathy and fun only make the sufferer worse and all spectators and officious friend must be kept away. The best treatment is quiet, gentle firmness with a dash of cold water in the face. Hysteria is not a wilful pretence of illness, but is a sign of ill health and calls for the care of the doctor, and especially for wise and reasonable treatment by parents and teachers.

Artificial Respiration

In dealing with apparently drowned or with partially asphyxiated from any cause, place the patient face downward with his face turned to the left and with the right arm bent, the elbow under the head. The mouth should be thoroughly cleaned or secured from other obstructing materials and the tongue pulled forward if the Schafer method of artificial respiration is the one employed, it will remain thus. All clothing around the neck and the chest should be loosened. The firstaider should sit near the body, kneeling on either side of his hips, and facing the head. Place the hands, palms underneath, on the lower chest wall, then lower the little finger edges in line with the lower ribs. If the hands are placed too high, they will merely press on the shoulder-blades and do no good; if placed below the thorax, the pressure is not exerted on the lungs. Now with the arms slightly extended, transfer the weight to the palms, keeping up the pressure for a time long enough to say one thousand, two thousand, three thousand. Then swing backward relaxing the pressure but keeping the arms still rigid as before for long enongh to say 'four thousand, five thousand'. These movements should be kept up until automatic normal respiration has been established. Artificial respiration should be persisted until sign of recovery are seen about, for life has been restored even after so long a time as two hours. The patient should be kept warm with rugs, coats and hot water bottles.

Another method of performing artificial respiration is known as Sylvester. The patient having first been quickly turned face downward, so as to empty the mouth, of water or other material that may be blocking the air passage, should be rolled out on to his back, a folded rug or coat being placed under his shoulders, so that the head may hang somewhat backwards. The operator then kneel with one knee on either side of the patient's head, should fold the patient's forearms on his upper arms, and grasp them firmly near the elbow. Then draw the arms steadily upwards and outwards as far as high as they will go, hold them there for a couple of seconds and then bring them down steadily and slightly to the front of his sides of chest wall, and press firmly on his chest for a further period of about

two seconds or a little less. These procedures should be continued regularly and without jerkiness for about 15 or 16 times a minute, until the patient begins to breathe. In the absence of a doctor it is wise to persist with artificial respiration, even for an hour or more though the patient may show no sign of life meanwhile. In cases where fracture of ribs, complications, asphyxiation, Schafer method cannot be used.

Mouth to mouth respiration is also one kind of respiration but can be well performed by trained persons or doctors only.

Sprains and fractures

Skeletal injury may consist of either of a dislocation or of a fracture. Sprains or injuries occurring at the joints where the damage has been insufficient to produce a real displacement of the body surfaces but has the temporary wrenching of them apart caused a dislocation of the ligaments holding them in position.

Though after damage to a joint, local burning reveals itself. In addition tendon is felt on the site of the rupture of the ligament, while all movements are painful and limited in their extent. A figure of eight bandage has a comforting and a supporting effect and help to check effusion into joint surface. Cold water frequently applied so as to keep the bandage moist, helps.

It should be borne in mind that slight fractures of the tips of bones again, especially about the ankle, are frequently undiagonised when occurring in conjunction with a severe sprain. Such small fractures can only be detected by X-ray examination. They need careful surgical supervision, since permanent stiffness of this joint involved sometimes follows.

Fractures are the result of violence. Fracture may happen at any point along the tendon of the bone, often at some distance from the joint. Deformation of the limb may be recognisable and is indeed often marked. The limbs make no voluntary movement and unwise method of diagnosis, rupture or a fine grating, due to rubbing together of the ends of the broken bone, will occur at the site of the fracture. When the patient is in pain, the pain is never as intensive as in the case of a dislocation.

If the damage is entirely limited to bones, a simple fracture results. Glands other times be involved, the fracture is regarded as complicated. The more serious complication is that in which the tip of the bone has pierced the skin, or in which there is a wound communicating directly or indirectly from the surface of the body to the seat of fracture. Such cases are known as compound fractures. The jaggered ends of bone may tear across adjacent blood vessels leading to haemorrhage; or may perforate the fibres in their neighbourhood, causing various dangers of paralysis. Bearing these possibilities in mind, every care should be taken to avoid their oçcurrence.

The most important of the complicated fracture, as compared with the simple and uncomplicated, lies in the degree of infection. On account of this potential danger it is essential that a simple fracture be handled as little as may be so as to prevent the occurrence of this dangerous complication of this injury. If a compound fracture is encountered the wounded surface must be carefully protected from the outer air.

Fractures are grouped according to their type of bone injury as greenstick, impacted, depressed and comminuted. The first three names refer to the shape and line of the break, a comminuted fracture is one in which, at this point of break, the fragments of bone are multifarious and even microscopic, which generally occurs in the bones of children and young persons.

The aim of first aid in all these cases, is the support of the limb and the preperation of the patient for transport. Stimulants may be needed to lessen the risk of attendant shock. If the limb bone has been involved, an inspection should first be made to exclude possibility of a compound fracture. Superficial and non-penetrating wound which usually exist, will need covering with a clean dressing. If deformity is marked, gentle friction should be exerted on the distal fragment until the limb is straight. It should pe maintained in its correct position and splints applied. The general rules for the application of the splints to an injured part are as follows:

(1) Whenever possible attempt to immobilise the joint above and the joint below the fracture.

(2) Apply splints to the outer and the inner sides of the limb. The outer splint should invariably be the longer.

(3) Never bandage the limbs too tightly or allow the splint to press unduly on the places such as elbow, armpit or bend of knees.

(4) Parts which may become painful on continued pressure such as ankle and knee, need protection from the splint by intervention of suitable padding.

A desperate situation sometimes arises when a fracture is associated with severe bleeding. Bleeding should be stopped by applying pressure on the artery that supply blood to that place before proceeding to the treatment of the fracture itself.

Exercise

1. Give the

   (*a*) Treatment for burns.

   (*b*) Symptoms of shock.

   (*c*) Treatment for Convulsion.

   (*d*) Types of fracture.

2. How will you treat a drowned person?

3. PUBLIC HEALTH

Have you ever thought how much the health of the village depends on the care and public spirit of every single family living in it? This is so, because if one family takes no trouble to get rid of mosquitoes, takes no interest in sanitation, has broken pots and filth round the house, then there will be more mosquitoes, more worm eggs and dysentery germs and more flies about the village.

The requirements for healthful living are—

(*i*) Provision of safe water supply and adequate drainage.

(*ii*) Provision of sanitary latrines and hygienic disposal of human and animal waste and refuse.

(*iii*) Control of communicable diseases.

(*iv*) Provision of medical care and maternity and child welfare services.

(*v*) Health education.

(*vi*) Improved housing.

(i) Provision of safe water supply and adequate drainage

Water is essential for survival of human beings, animals and plants. It is also easily contaminated and such, is responsible for a number of diseases—cholera, typhoid, dysentery etc. To drink pure water is one of the best ways of keeping well.

The best kind of well is one in which the water is drawn up by a pump; then the well-top can be completely closed in, so that no dirt or dirty water can get into the well water. Wells from which drinking water is drawn should—

(*a*) be a good distance from any house or from any place used as a compost pit or latrine;

(*b*) be dug on high ground;

(*c*) be lined with bricks which, if possible, are covered with a layer of cement;

(*d*) have a low wall round the top of the wells;

(*e*) have a cemented platform sloping away from the well so that any spilt water can drain away;

(*f*) have a cover;

(*g*) have a special bucket to let down into the water which is hung up away from all dirt when not in use;

(*h*) have separate slabs for washing clothes, and cemented trough for watering animals can be constructed, separate from the main structure of the well.

Wells should be cleaned out at least every two years. If the well is not a good one, the only way to be really sure that the drinking water is pure is to boil it, and then put it in a covered vessel. The other sources of water like pools, tanks, taps must also be protected well from contamination.

Disposal of sullage

In majority of our villages and most of our towns, there is no arrangement for the hygienic disposal of sullage. If there is no provision of water carriage system, soakage pits can be constructed in each house and the sullage can be disposed off.

(ii) Provision of sanitary latrines and hygienic disposal of human and animal waste and refuse

Stools and urine should be prevented from coming anywhere near water supply which will be used for drinking, and should never be left on the ground where flies can settle on them. Stools are dangerous because, if people have illness such as typhoid fever, dysentery or cholera, the germs of these diseases are passed out in large numbers in them. The same thing happens to the eggs of the different kinds of worms which are found in the human intestines.

Good ways for the disposal of human waste

A drainage system with sewers—this is only possible in big towns. Here stools are washed down into large pipes which travel underground. There they are either purified and made harmless in one way or another. Latrines—these are holes or pits into which the stools can be passed and if properly made, are very satisfactory.

Bored hole latrines: These are always made outside the house and only where the soil is not rocky. A hole 16-20 feet deep is dug. The upper 2 feet must be supported by some means to prevent the earth from caving in. A squatting plate is placed on the top of the hole and a super structure is erected for privacy. The bore must be filled up when the level of excreta reaches 3 feet of the ground level. A fresh bore can be dug and the squatting plate removed and placed on the new bore.

It should be located atleast 50 feet away from the source of water supply such as wells and tanks.

Trench latrines: In some areas soil is rocky and it is difficult to construct latrines. For such areas trench latrines are useful. The latrines are constructed by digging a trench 12 feet in length and about 3 feet in depth. The width should not be more than 12″. The trench can be partitioned into four parts by means of some old gunny-cloth or matting and the same material can be used for screening the whole latrine. The user must throw some earth to cover the faeces after use. When the trench is filled within 6″ of the surface, it should be closed and sprinkled with lime and new one dug for use.

Disposal of dry refuse: Refuse from the kitchen such as vegetable peelings and skins of fruits, sweepings from the house consisting of pieces of straw, paper etc. should be collected and deposited in the manure pit. After depositing, a layer of earth may be thrown on this to prevent fly-breeding. When the manure pit is filled, it should be covered with earth and allowed to remain there for a period of six months to one year, after which it may be dug up and the contents used as manure in the field. Cowdung and other animal wastes can also be collected and deposited in the manure pit and processed as above.

(iii) Control of Communicable diseases

Communicable diseases like malaria, small pox, cholera and plague can be prevented by drinking safe water, using clean latrines, keeping the house and surroundings clean and taking vaccination and inoculation at the proper time.

(iv) Proper use of medical care and maternity and child welfare services

The available medical facilities within the reach must be utilised to the maximum possible to cure the diseases and to prevent ill health.

(v) Health education

The people in neighbourhood can be given education in personal and community hygiene.

(vi) Improved housing

The house should be so constructed that there is plenty of light and air in all the rooms. It is essential to construct smokeless chula or any other oven so that the house is always kept clear of smoke.

Exercise

1. What are the requirements for healthful living?
2. Write about the disposal of sullage.
3. Observe the drainage system available in your locality and write the methods of improving the system.
4. How will you clean your kitchen wastes?

REFERENCE BOOK

The St. John's Ambulance Association (India) I, Red Cross Road, New Delhi,—'First Aid'.

CHAPTER IV

LIFE IN THE FAMILY AND POPULATION EDUCATION

1. MARRIAGE—A SOCIAL INSTITUTION

In our society marriage is a civil contract between the two parties and is subject to regulation and registration by the state. The state, which is the organisation of the citizens for the guarding of the public welfare, has an interest in the family because of the functions ordinarily assigned to and assumed to by it. The regulation of marriage is deemed a reasonable function of the state. Whether a man and a woman joined each other in the procreation of young or not, both men and women wanted to join with others in groups for the sake of companionship, for protection and for the division of labour so important to material security. This grouping together of individuals for a common advantage was probably the process which could first have been called the formation of families. Through the mating of men and women and the closeness of sex and blood ties, the instinct to care for the young and the intimacy of the associations involved in the procreation, bearing and rearing of the young, family ties became more and more those of blood; and society, realising the importance of the group or family unit, gradually imposed the marriage customs and laws which we know today to protect those units, as far as possible, and prevent their destruction. Only through the stability of these units can society as a whole be stable.

This implies that the relationship and social roles of man and woman were fixed by custom. Today with the emergence of the individualistic family pattern we think of marriage not as a state, but as an adjustment. This is so because customs no longer rigidly define the roles of man and woman. Every marriage presents the man and woman with the problem of working out their relationships and roles.

In modern marriages, happiness is the goal. Many men want a quiet submissive wife while others will be more interested in a girl who is outspoken and ambitious. Furthermore, the domineering husband is not the perfect husband. Each member must try to satisfy the other person's needs and these needs vary in character and intensity from one person to another. This accommodation is needed in every marriage because no two people have identical interests, desires and wishes, nor do they completely monopolise each other. Each one should give in to a certain extent, to the other.

From the beginning both husband and wife must work together to make their marriage a success. They need to carefully consider what has to be done, budget their resources and their time, assess their talents and decide what they want to achieve in their marriage. Planning together in an intelligent way and assuming joint responsibility will help to achieve physical and mental health and satisfaction in marriage.

Marriage as a social institution enables the couples to achieve the following:

(1) It fulfils the functions of the family such as—

(*a*) perpetuation of the race, bring up the children and educate them.

(*b*) constituting a society with stable families as the basic units.

(*c*) Transmission of culture.

(*d*) Promoting religious attitudes and functions.

(2) It satisfies the personal needs of the individual such as love, appreciation, security, respect, self-confidence, feeling of importance, stimulation of ambitions, support in difficulties, relieve loneliness and provide intellectual companionship.

(3) It gives individuals social status. Married people, in general, are respected by others.

(4) It provides economic security for women.

There are also business and professional marriage. Others marry just for a change, for adventure, fulfil romantic feelings or to escape from the present unpleasant situations.

Types of marriage

There are four possible combinations in marriage—

(1) Marriage of one man to woman is called 'Monogamy' which is common in all societies. It has the approval of the public and sanction of the law.

(2) Marriage of one man to a number of women is called 'Polygamy'. This type appears at the higher states of the primitive cultures, particularly as private property increases and as the man gains increased power in the family. In spite of society's approval and the high status it offers, it has never been universal, since the number of men and women are almost the same. The women of the past might have accepted co-wives, but the women of today are independent and strive for equality of status with man. Polygamy is still widely prevalent among the Muslims all over the world and also amidst some tribes.

(3) Marriage of one woman to more than a husband is called 'Polyandry'. Sometimes, the brothers share a wife. At present in India, some of the tribes still favour polyandry and they worship Pandavas and Dhroupathi as their Gods and Godess respectively.

(4) Marital relationship between plural women to plural men is referred to as 'group' marriage. It is exceedingly rare. In India, it is practised by Todas of Southern India.

(5) When marriage takes place within a particular caste, it is called 'Indogamy'. Marriage takes place between families of equal social and cultural status. The main aim is to preserve the relationship within a particular caste or community. In order to make it more stable, marriage between certain relatives as indicated below are preferred.

(*a*) Cross cousin marriage—Under this, marriages are preferred between father's sisters and his sons or between maternal brother's and sister's children. Home tribes in India such as Gonad, Kadar and Koerya practise this form of marriage.

(*b*) Parallel cousin marriage—Under this, marriages are preferred between the children of father's brother and mother's sisters. Some civilized societies prefer such marriages.

(6) The form of marriage which prohibits a person from marrying within a defined social group of which he is a member is called 'Exogamy'.

(7) In 'Hypergamy', a man of a higher caste can marry a woman of lower caste. The children born out of such marriage are regarded as belonging to caste falling in midway between that of the father and that of the mother.

(8) In 'Hypogamy' a woman of upper caste hindu society can marry a man of lower caste.

From the sociological point of view, all preferences and prohibitions aim at social control of human instinct of mating. Preservation of social purity, group stability and conservation of cultural traits are the other factors considered.

Combating social evils

Some of the harmful social evils are caste exclusiveness and untouchability, purdha system, unhygienic practices, polygamy and polyandry, and dowry system.

Caste exclusiveness and untouchability

This sytem denies equal opportunity to all and leaves no choice for occupation. A person is condemned to a hereditary profession regardless of his talents, likes and attitudes. There are economic advantages. Every man inherits a certain amount of skill from his parents. It also protects the weak and everyone finds a place in the economic organisation. But conditions have changed fast and occupation is now a privilege to all.

Until some years ago, the untouchables could not use the public road and the public wells. They could not enter Hindu temples or study in public schools. They had their own villages and contact with members of higher castes was strictly prohibited. Mahatma Gandhi fought for the abolition of discrimination on the basis of caste. According to the Constitution of India—1950, untouchability is abolished and its practice in any form is forbidden. Practice of it in any form is an offence punishable in accordance with law. Old types of occupation have disappeared and industrialization has taken its place. Exclusion is difficult almost impossible in our set-up even though the Indian community is composed of many castes.

Purdha system

Women adopting the purdha system use loose aprons to cover up the whole body including the face cnd the head in the presence of men and revered people to express feminine modesty. These days, it is becoming flexible and some communities are giving it up slowly. There are still some who stick to it. Legislation cannot change them as personal and private rights of individuals need to be respected. Religion on the contrary, favours this social practice.

Unhygienic practices

Eugemis is the science that propagates hygienic practices in living. Child marriages, marriage of the immature, ignorance of sanitary living, lack of literacy and knowledge of the medical legal and social aspects of living have been observed in different parts of India. Though efforts have been taken to eliminate these, thorough success has not been achieved. Hygienic practices such as establishment of healthy surroundings in work place, prevention of diseases, accidents, preventive measures against contagious diseases must be used in industry and all occupational fields.

Diet surveys carried out in different parts of India have shown that food consumption is insufficient to provide the necessary requirements of the family in the majority of the people. Malnutrition reduces the vitality and efficiency of the individual. Increasing the food production coupled with

nutrition education will be effective steps to combat malnutrition.

Polygamy and Polyandry

Women had many disabilities under the ancient Hindu Law. A Hindu woman could not remarry another man, while her husband was alive, while a male Hindu might legally marry any number of wives. A Hindu widow could not marry again. But now the Hindu Widow Remarriage Act legalises the marriage of Hindu widows.

The Hindu Marriages Disabilities Removal Act, 1946 and The Hindu Married Women's Right to separate Residence and Maintenance Act, 1946 have given equal rights to women and the constitution has declared woman equal with man in all respects and has forbidden all discrimination against them. All the legal disabilities are thus removed and no person could be deprived of the opportunity to serve and do anything on any ground either of sex, caste, religion or faith.

A Muslim woman cannot have more than one husband at a time, though the number of wives a man may have is four. A Muslim woman cannot marry a non-Muslim whereas a Muslim man may marry any Kitabi. The Dissolution of Muslim Marriage Act, 1939, gives a woman married under Muslim Law, the right to obtain a decree for dissolution of marriage on the following grounds :

(*i*) Whereabouts of husband not known

(*ii*) Failure to maintain her for two years

(*iii*) Imprisonment for seven years or more

(*iv*) Failure to perform marital obligations for three years

(*v*) Insanity for two years

(*vi*) Marriages of girls before fifteen can be repudiated by them on their attaining the age of eighteen

(*vii*) Cruelty such as assault, leading a bad life, forcing her to immorality.

All the disabilities of women relating to marriage and guardianship are subject to customary rights.

Dowry system

In spite of the efforts taken by the social, political and religious leaders to abolish the dowry system, it still exists in most of the communities in various forms. The lives of many are miserable due to this custom. Many women continue to be spinsters and some do not lead happy lives even after marriage as they are unable to satisfy the husband and in-laws with their dowry. The anti-dowry movement started during this decade had aroused the interest of the youth who conducted rallys, seminars and debates on the subject to bring about a revolutionary change in the community. We still have a long way to go to abolish the dowry system completely.

Preparation for marriage and parenthood

Marriages should bring happiness to the individuals who enter it. The kind of marriage a person makes depends upon the kind of person he is and secondly upon the person he marries. So the character and temperament of the individual, his concept of his own self, the personal needs that have to be satisfied, the maturity of his thinking, his capacity for decision-making and other personal qualities are most important in deciding the success of marriage.

A happy marriage is never presented to a couple like a gift. A happy marriage is an accomplishment. One takes with him (or her) into marriage the basic habits and personality which has developed over a period of years. When people live together there is certain to be some disagreement, as they are individuals with minds of their own.

In the old days, in joint families the parents, grandparents, uncles, cousins, aunts, brothers and sisters-in-law provided much security. So there was not much dependence upon the mate for emotional response and many of the most necessary satisfactions. The needs of the husband and wife have to be satisfied to a large extent in marriage today.

Due to these reasons, it is important for those who are moving towards marriage to understand themselves their perspective mates and learn what marriage is all about.

Divorce figures are increasing year by year throughout the world. These could have been prevented if young people had made more careful preparation for marriage and were more careful in selecting a mate.

In addition to divorce and desertions thousands of married people voluntarily agree to live apart without obtaining divorces. There are many other couples, who live under the same roofs but where marriages are 'on the rocks'. Due to social and economic pressure they live together, but their family life is nothing but an empty shell.

Many husbands and wives get along satisfactorily but do not experience wholesome happiness in marriage. The absence of serious difficulties does not necessarily mean that the couple is getting the most out of marriage.

Careful preparation for marriage helps to reduce difficulties and promotes adjustment. It is of course true that no marriage is perfect and all have problems and difficulties but the above mentioned facts depict a crying need for better preparation for marriage. With the general lack of preparation for marriage today and the rapidly changing social conditions, family breakdown is likely to become an undesirable personal experience for many.

Responsible parenthood

Great responsibility is involved in the raising of the family properly. The happy marriage as well as the responsible parenthood have to be maintained. So this cannot lead to any haphazard family size of excessive population. A neglected child is very often an unhappy and emotionally maladjusted child. If parents want children, they must make sure that the children's needs will be fulfilled as well as is possible. The first duty of parents is to love their children. When the child receives parental love and affection, he will react favourably

to the efforts of his parents to educate him in the ways of virtue. Parents must also set a good example to their children. Further, they must be the prime educators in the moral and religious formation of the child. Only at home, the child is taught the love of God and the way to pray. He learns to be fair and honest in his play which is the starting point of his moral training.

How to prepare for marriage and parenthood

Every individual knowingly or unknowingly, is prepared for marriage in every family. The growing adolescent observes the members keenly and forms many ideas about the roles to be fulfilled in marriage. Hence, the parents need to carefully set an example and train the children in a positive way, at the sametime considering individual differences as well as the changing society.

In addition to this, there are other ways in which a young person can prepare for marriage and parenthood.

(i) Attending classes: In our country there are only a few educational institutions which offer courses on this. A trained person usually disseminates the relevant facts scientifically with suitable teaching aids and methods.

(ii) Reading relevant books and magazines: There is an increasing emphasis on books written by medical personnel, psychologists and other experts these days. Libraries also provide such books. The parents must help their children in selecting the right type of book.

(iii) Discussion with friends and experienced persons: Young people generally feel free to discuss with friends in whom they have confidence and who are getting along well in marriage about many of the decision and plans that are of vital concern to them. But the final decisions must be made by the couple.

(iv) Pre-marital counselling: The aim of marriage counselling is to assist the couple mainly through interviews to understand themselves, each other and their relationship. A competent marriage counsellor helps them to analyse their view points

and values very objectively. However pre-marital counselling needs to be popularised in India.

(v) Consultation with doctors: A thorough physical examination is a pre-requisite for a successful marriage which includes blood test, pelvic examination of the girl and so on. Discussions about child spacing, venereal disease and other basic processes are helpful in assisting a couple to prepare for marriage in a mature way.

(vi) Considering the major factors which influence marital adjustment: There are some factors which make marital adjustment smooth and natural. They are getting well acquainted, having common interests, similar cultural and religious background, chronological and emotional maturity, getting parent's approval, and similar goals and basic philosophy of life.

Through these ways the individual must continuously analyse himself objectively and must strive to improve himself. The inner urge for improving oneself is the key factor influencing all the learning process. The different steps involved in this learning are understanding one's strengths and weaknesses, accepting oneself for what he is and making every attempt to bring out the best in his personality.

Maturity needed for marriage and parenthood

A mature person is one who is capable of accepting life as it is, facing the present and the future realistically and optimistically and assuming responsibility for his actions. One must analyse oneself open-heartedly to assess whether he possesses the following qualities:

(i) He maintains a proper balance between dependence and independence: One must take up decisions by himself and must not be tied to the apron strings of a parent. At the same time he must have the capacity to accept pertinent advice and help from others and be reasonably dependent upon his fellowmen.

(ii) He faces life as it is, optimistically and with faith in the future: There have been always problems, uncertainties and

crisis along with the satisfactions and successes and these probably always will be. The mature person recognizes that these may appear and does his best to face them realistically. Many of the problems and uncertainties of life result in growth and development if accepted as challenges by mature personalities.

(iii) He lives mainly in the present: An immature person often lives too much in the past, recalling the 'good old days' or dreams only of the future when 'all will be rosy'. A mature personality recalls the past to enhance his perspective, projects his vision into the future to plan intelligently, but in the main lives and reaps satisfaction from the present. He enjoys life as he goes along day by day.

(iv) He appreciates and respects his parents: Children who grow up in a home where love and security abound usually maintain deep love and respect for their parents even though they live independent lives. Too many young people, when they marry remove completely the ties from their parents. Visits, phone calls and letters can be highly beneficial to both parents and offspring.

(v) He adjusts to his environment and associates in a socially approved way: A mature person respects, attempts to learn, understand and abide by the rules of the society in which he lives. For example, he gets recognition and approval for achievement in school and in work rather than through anti-social behaviour such as crime or vice.

(vi) He has the ability to love and serve others without too much interest in self: His love is mainly outgoing and self love is reduced to a minimum. A mature person gains satisfaction from helping others and in doing things for them (in economic, social, psychological or religious). The immature person projects himself into the centre of living and reduces other people to secondary positions.

(vii) He has the ability to see himself as a part of a larger whole: A mature person recognizes in his fellow men and in the universe, a power and greatness surpassing his individual importance. Burkhart mentions three normal stages in the

wholesome development of each personality, 'first dependence, second independence, and third inter-dependence'. One is mature only if he reaches this third stage where he grows beyond the self into a loyalty to a universal self.

(viii) He accepts others: His prejudices are at a minimum and he respects the sincerity and integrity of others. He has a sympathetic appreciation of other's feelings and attitudes and is flexible and capable of adjusting to new social situations. He accepts cultural differences and of people as they are regardless of colour, race, religion or nationality.

(ix) He has the ability to enjoy a balanced programme of work, rest, play and worship: He does not carry any of these to the extreme. He lives a moderate life and avoids overstress or overparticipation in any one aspect of living.

(x) He makes temporary sacrifices for long-range values, goals and satisfactions: He is guided by principles and long range goals in his actions and is willing to surrender immediate satisfactions for more lasting values.

(xi) He is guided by reality rather than by fears and imaginations: He lives in a world of reality and faces things as they come. He is not unduly fearful about the difficulties the life presents.

(xii) He is not easily hurt by statements or acts of others: He can laugh with his associates at himself and can accept criticism without resentment when it is warranted. He is objective and can separate his thinking and action from his personal biases.

(xiii) He possesses a wholesome attitude towards sex: He sublimates his basic drive before marriage but freely recognizes its appropriate role in marriage. He understands that a reciprocal love relationship is an important need of all people and that particularly within marriage it can be genuine resource for strengthening and adding meaning to marital union.

(xiv) He has self-control: He has learned self-discipline. A mature person understands his own drives and feelings and is

able, in the main, to guide his behaviour in keeping with the mores of the society in which he lives.

Obviously no individual has all of these characteristics to the fullest degree. However, the more of these traits he possesses, the better able he will be to function in a mature manner. Likewise, the fewer of these a person possesses, the less likely he is to become a mature marital partner.

No substitute has been devised to return satisfactions equal to those received from bearing and rearing children. Procreation of children and the building up of the family is one of the important objectives for a couple getting married. This is a matter that should be faced squarely and frankly, since bearing children and raising them is a great task and involves plain hard work and responsibility.

For the mother, the children become a full-time responsibility. For the father it is an added responsibility and this will influence where and how he is going to live with his family. The responsibility becomes aggravated if added by poverty and illness.

So the couple must decide beforehand, when they want the first child to arrive, the spacing and the number of children. This approach will be beneficial in the long run and mutually satisfying. If people do not plan intelligently, it will affect their values, quality of life and all the basic necessities.

The preparation of marriage and parenthood will certainly help the young couples to weigh their philosophies of life and take up constructive decisions which will help in bringing up very admirable families contributing to the welfare of the nation.

Exercise

1. Interview newly married couples and analyse the problems faced in the different areas of adjustment.
2. Visit a tribal area and study their marriage procedures.
3. A study on the adolescents' expectations from marriage.

2. THE FAMILY

The family is the most natural and an extremely old institution. No one knows how long it has been in existence, but some forms of family definitely existed many thousands of years ago. Although there are important divergencies in family forms and functions from society, to society it is an universal institution of all known societies.

Family is chiefly responsible for biological survival and social well-being for it provides a socially approved method both for bearing and rearing children. As the care and training of the future citizens of the society is entrusted to the family, it is the centre of our total cultural pattern.

The meaning of family

Burgess and Locke (1960) define family as 'a group of persons united by the ties of marriage, blood or adoption, constituting a single household, interacting and intercommunicating with each other in their respective social roles of husband and wife, mother and father, son and daughter, brother and sister, and creating and maintaining a common culture.'

According to Baber (1953) family covers several types of groupings:

(1) the traditional group of married father, mother and their children;

(2) one parent and children if the other parent had died, deserted or been separated or divorced;

(3) married childless couple;

(4) unmarried couple with or without children who have lived together long enough to be considered as man and wife by common law;

(5) a man with several wives with or without children or a woman with several husbands with or without children, and;

(6) a group of related persons living together as a household.

According to Duvall (1956) there are certain universal purposes that families of all times share. Giving a man and woman the right to live together, have children and bring them up as they will, have been the main purpose. For the individual family, this means keeping the family members safe (from intruders, dangers and threats), well (prevention of sickness, recovery from illness, maintaining health through food, rest, and care) and in tune with their times (able to use their resources and to gear into life around them).

Types of families

The family is classified on the basis of the person who controls the family, the recognition of the descent and the place of residence.

(1) *The paternal family:* The preliterate family in which the organization was according to paternal descent, the girls went and lived with their husbands, in the dwelling place of their fathers, mothers, married brothers, their wives and children. The child was controlled by the relatives.

(*a*) *The large patriarchal family:* It is characteristic of ancient society, with the patriarch exercising absolute power, over the members of the family.

(*b*) *The small patriarchal family:* It originated in the medieval period, composed of husband and wife, generally with the presence of one or two grandparents, one or more unmarried brothers or sisters of the parents. The father or the grandfather was the dominant taking up all the important decisions of the family.

(2) *The maternal family:* In some preliterate communities, the family was composed of the old matron, her sons, her daughters and the children of her daughters. The sons lived with their mothers and were only visitors in the homes of their wives, who also dwelt with their own mothers. The maternal uncles namely the brothers of the mothers were the ones influencing all the decision making of the family.

(3) *The patrilineal and matrilineal families:* When the boys were recognized it was patrilineal and when girls were recognized it was a matrilineal family. Where the members of the extended family lived together according to the matrilineal descent it was called maternal family and if by patrilineal descent, it was the paternal family.

(4) *The patrilocal and the matrilocal families:* When the members resided near the husband's parents it is named as patrilocal and if near the wife's parents it is matrilocal family.

(5) *The endogamous and exogamous families:* When an individual is restricted to choose a mate within the same kinship group it is the endogamous type. In exogamous families, the members marry outside the kinship group. A boy marrying the uncle's or the aunt's daughter is common in some parts of India. Exogamy is observed in more advanced communities and other countries.

(6) *Modern democratic family:* The industrial and technological advancement which have lead to the breakdown of the joint families, have brought about the small family system in the urban as well as the rural areas. The husband and wife have equal rights in running the family. The children in the family are brought up on a democratic basis with more freedom. Young people have more freedom from parents after marriage.

There are two common systems of family namely the joint family which was more common in the past than the present and the nuclear family.

The joint family

Bell and Vogel defines that the joint family is based on the relations among adult males rather than on the conjugal bonds between spouses.

The joint family is common in India and China among all the countries. Chandrasekar (1960) states that it is an economic, social and religious co-operative unit where all adult members follow the principle of give what you can and take what you need.

Characteristics of joint family

(1) *Common household:* The separate family units which constitute a large joint family live under the same roof. For personal purposes each unit may have separate rooms, but common household activities such as cooking, dining and praying are done together in areas or rooms allotted for these purposes. The household activities are shared by all the women and as in traditional set up, the food is served to men and children first.

(2) *Common property:* All the traditional joint families held common property such as a farm unit in which the men as well as the women folk worked in their respective capacities. Thus the joint family produced much along with consumption. The father was the authoritative and controlling figure who possessed all the income of the family and decided how it had to be spent for various purposes. On the death of the father, the eldest son took up this responsibility. The property was passed to the sons. The property was divided by the sons if they so desired, only after the demise of the father.

(3) *Common worship:* Religion, rituals and ceremonies were part of all joint families in which family worship was carried out everyday. Though all the members participated in it, the eldest male member performed the sacred rites.

Functions of the joint family

In the joint family there was protection given to the aged, the sick persons and children. As it was the common responsibility, the aged ones had security and the family unit of the sick person did not suffer economically or socially. The children had someone or other of the women folk to protect and care for them.

Due to the existence of large number of family members of different ages and the strong kinship, life was very busy and nteresting with numerous visitors coming and going and never ending functions and festivals going on in the family. There were excitements, companionships and also chances of conflicts and disputes. But each member experienced a sense of security,

status and belongingness in the family. The loss of a member or property was somewhat compensated by the support of other members in the family.

Impact of modernisation and urbanisation on the joint family

The sweeping changes brought about by modernisation and urbanisation have led to the disintegration of the joint family system. With increasing education and job opportunities the sons have migrated to cities or other areas and the nuclear families are becoming more common not only in the urban but also the rural areas. But the members continue their relationship with the parent families by joining them on occasions such as festivals.

As the common property is divided among sons in each generation, most of the members do not depend upon them as the main source of income, instead seek job opportunities outside their area of living.

As the job opportunities and educational facilities are more in the urban area, many families prefer it to the quiet rural life. In spite of the break down of the joint families the members of the nuclear family continue to have strong ties within the family and the members are more dependent on each other for security, guidance and support.

The nuclear family

The nuclear family is patterned on single family system wherein the husband and the family enjoy almost equal status and can claim independence of each other. It consists typically of a married man and woman with their offspring although in individual cases one or more additional persons may reside with them.

The modern nuclear democratic family has the following characteristics :

(*i*) freedom of choice of a mate on the basis of romance, companionship, compatibility and common interests.

(*ii*) independence from their parents of the young people after marriage.

(*iii*) the assumption of equality of husband and wife.

(*iv*) decisions reached by discussion between husband and wife in which children participate increasingly with advance age, and

(*v*) the maximum of freedom for its members consistent with the achieving of family objectives.

Functions of the nuclear family

The family fulfils its roles in relation to the individual members, the family values as well as the community's expectations. The major functions are as follows:

(1) *Biological functions:* Perpetuation of the race and care of the offspring are the obey functions of the family. Boys add prestige to the family not only because of the superior status offered to them by the society, but due to the belief that certain rituals during death ceremony need to be carried out by them. Further, children bring much joy, thrill, excitement and satisfaction to the couple and other family members. They act as a binding force especially with the grand parents.

(2) *Protective Functions:* The family offers very stable protection to the old, sick and weak persons. No other institution can take up this responsiblity due to the strong emotional bondage which exists among the family members.

(3) *Economic functions:* In past, family was the producer of goods, but now it is mainly a consumption unit. In the nuclear family the father is the bread winner, though in some families the mothers take up either full time or part time job outside the family. Thus the adults earn for the family and help the youngsters grow under their protection. There is much effort taken in nuclear families to save money as it has to support itself without expecting help from others.

(4) *Educational functions:* Although much education takes place in the community, the home remains the cultural agent which continues to transmit the cultural patterns and heritage down through the years. The training of the child starts in

early infancy and the home continues its influence even during the later years when the other agencies such as the school assume prime importance. The values imbibed at home cannot easily be changed.

(5) *Socialising functions :* Through interaction with family members the child becomes socialised and learns how to get along in the society. The social and emotional climate in the family are the chief contributing factors which determine the quality of social skills acquired by the children.

(6) *Recreational functions :* The role of the nuclear family is limited as the outside agencies such as the clubs, library, theatres and playgrounds take up much of the youngster's time. In spite of the varied recreational interests, the recreation offered by the family is of great significance. After a whole day's serious business, the members can be together and enjoy common interests. Common interests act as binding forces. The members can also plan to undertake small excursions, or even have a walk outside the home. Recreation shared at home develops a deep sense of security in children than those enjoyed outside.

(7) *Affectional functions :* Every child needs unconditional love and affection from the parents. It starts from infancy and needs to grow continuously. Children who are sure of their parents' love have relatively few emotional disturbances and are able to face life's challenges more readily than others.

The strains on the nuclear family

The modern nuclear family has to be independent and self-sufficient in earning for livelihood and taking care of the children, the sick and the aged. When there is much change in the society, certain traditional habits of celebrating festivals and functions elaborately and giving a lot of dowry and gifts for the daughters still continue in many societies. However, with the increasing number of day to-day needs and spiralling up of the price level, the nuclear family is unable to save much money for such expenditures. All over the country, the leaders, women as well as the youngsters have risen against the evil effects of dowry system.

Further, the elaborate rituals and ceremonies, both cultural and religious also need to be cut down, with more stress on moulding the personality of the members with cultural and religious values of high equality.

Use of leisure time activities

The leisure time of children and adolescents needs to be filled with recreation both pleasurable and constructive. All persons need recreation. No life can be called well-balanced if a place is not made in it for a variety of healthful and enjoyable recreational activities. These activities are voluntarily engaged in by all the people, young and old, rich and poor, rural and urban, cultured and educated in order to find happiness, fun and delight in self-expression. It gives refreshment to body and mind after work and eases the tensions created by the daily routine.

Through recreation, special interests and hobby groups one can discover himself and socialize his inner impulses. Delinquency and crime are less likely to flourish in those communities which have provided adequate and attractive recreational facilities. Studies show that a majority of children brought before the court could not properly utilise their leisure time either at home or in the community.

Exercise

1. Find out the advantages and disadvantages of nuclear and joint families from members of the respective families.

2. Analyse the role played by the different members in different families.

3. THE POPULATION TRENDS IN INDIA

Today Population grows much faster than at any time in history. Next to avoiding nuclear war, man's foremost challenge

today is to achieve a world-wide reduction in population growth. At present the population of the world is growing at a rate of about 2 percent per year. A United Nations study points out that whereas it took over a million years from man's beginning upto 1,800 for the world's population to reach the first billion, the second billion was added in only 120 years, from 1900 to 1920, and the third billion was reached in forty years in 1960. In mid-1970, the world population totalled 3,632 billion.

The human family is presently gaining an average of 1·4 million members a week, 199,014 a day, 8,292 an hour and 138 a minute. If the present 2 per cent annual population increase continues, twice as many people will be living on the earth in the year 2000 as there were in 1960. Now more than three billion, the world's population will rise to more than six billion during the period 1960 to 2000. The addition of a fourth billion to the world population will take about fifteen years, and the fifth billion less than 10 years. The dismal forecast is that within 800 years, there would be one person for every squarefoot of land surface on the globe. Chart I shows estimated rate of population growth for the years 1650—2000.

Chart I

ESTIMATED RATE OF POPULATION GROWTH

(1650–1980 A.D.)

Year		World's Population (in crores.)
1650	...	47·0
1750	...	69·4
1850	...	109·1
1900	...	155·0
1950	...	245·4
1980	...	362·8

India's Population growth

During the period between 1931 and 1971, India's population has almost doubled. The growth rate of population in India has accelerated from 1.3 percent per annum in the year 1950, to 2·5 percent as per the recent 1971 census. There were 547 million people in India in 1971 according to the census count. About 15.3 percent of the world's inhabitants now live in India which constitutes only a little more than 2 percent of the world land area.

It has a high annual birth rate of 41 per thousand. A baby is born every second and a half, adding 21 million births a year to the population. About 8 million persons die every year—a high annual death rate of 16 per thousand. Thus, the nation adds 1·1 million people every month or about 13 million people every year to the existing population. This means every year the nation adds population equivalent to Australia's present population, or in five year's time, a population equivalent to that of the United Kingdom.

The population is growing at the rate of slightly over 2.5 percent per year. At this rate, India will surpass the 1,000 million mark (one billion) by the end of the century—about 27 years from now.

The major cause of this high rate of growth is not so much the high birth rate as the increasing success which modern methods of control of infections and parasitic diseases have been implemented. Major communicable diseases like malaria, cholera and small pox have been nearly brought under control and measures to eradicate them are now being put into effect. The birth rate in India has remained relatively stable. At present the birth rate is estimated to be about 41 per 1,000 population and it was about 45 per 1,000 in the year 1900. In 1901, the death rate of India's population was 41 per 1,000, and today it is estimated to be 16 per 1,000. As a result of the relatively improved health conditions, life expectancy has risen from 27 years in 1920 to 51 years in 1968. This means that a larger number of people live through the reproductive age. This high and stable birth rate is the main cause of the rapid growth of India's population.

Effect of population growth on the national resources and the need for small families

Majority of the world's leading scientists stress that the population increase constitutes the gravest danger in the history of man. It affects the quality of life as a whole.

The developing countries are losing race between food production and the expanding population. With 547 million people according to 1971 census, we are in a position to feed about 300 million people. About 247 million people are either starving or are on the brink of starvation. In spite of the herculean efforts made by the voluntary groups, there are more hungry mouths in the world today than ever before in the history.

Larger the size of the population, lower will be the per-capita income. The growth of economics is fast being 'eaten up' by even more rapid growth of population. India's total income increased from Rs. 0·86 billion in 1948–49 to Rs. 1·49 billion in 1966–67 or an increase of 73·25 per cent over a period of nearly two decades. But the per capita increased during the same period from Rs. 248 to only Rs. 297, a meagre 19·76 percent.

Employment is another area of serious concern on account of rapid population growth. Rising population makes the solution of the problem of unemployment more difficult. The competition for jobs, positions of leadership and responsibility will increase sharply as the population grows.

Now about 20 percent of the country's total population occupy its urban space. It has been estimated that the shortage of urban houses may be 1·54 crores in 1979. Our country's population growth is becoming a direct threat to the determination of our environment, the depletion of natural resources, breakdown in essential services and the rapid disappearance of many amenities of life.

A rapid rate of population growth affects every one's access to education. It also leads to degradation of available energy sources, scarcity of all types of commodities and pollution of our

atmosphere. It has been added that for the 13 million persons added every year to the population the additional resources required would be 1,26,500 schools; 372,500 school teachers, 2,509,000 houses; 188,774,000 metres of cloth; 12,545,000 quintals of food and 4,000,000 jobs.

Our population is much large to permit decent levels of living and reasonable prospects of economic and social development and so population restriction becomes an urgent national concern.

These harmful effects on the population point out the need for small families and the dangers of unplanned families. Harode's (1973) study with urban, middle income homemakers reveals that the arrival of additional children in the family created increased demands on time and money resources of the family for child care purpose, thus cutting short the resources available for social, cultural and personal expenditure.

Sri Avinashilingam Home Science College studied the family size, calorie and protein intake and nutritional status of 125 children, with reference to their heights, weights and clinical picture. The study revealed that children from the small families had a better nutritional status in terms of the aspects measured, than children from the large families (Devadas, 1976).

Research done in Cleveland and Ohio shows that larger the family size, the greater the number of gastro-intestinal illnesses per year. Data from the United Kingdom indicate that children of large families are smaller in size. In a follow up study of pre-school children in U.K., Douglas and Blumfield report that there is an inverse relationship between the number of children in the family and such aspects of family life as adequacy of housing, rating of mothers in child care and the height of the individual children.

The facts show very clearly that only if the family size is limited, the parents will be able to give individual attention to their children and fulfil their physical and psychological needs to promote a wholesome personality development. In large

families, inspite of sufficient income and basic facilities, individual and adequate care cannot be given to the individuals. Responsible parenthood leads to mutual love, respect and harmony between husband and wife, parents and children.

Family Planning Programme

Alarm bells have been sounded throughout the country to create a national awareness of the grave threat to our country posed by the population explosion and the administrative machinery at all levels is being geared to provide necessary infrastructure of health services to every hearth and home in every hamlet and village.

The Family Planning Programme in India was officially launched in 1952. But the evaluation of the first two Five Year Plans (1951–61) revealed that the rapidly growing population was adversely affecting the rate of socio-economic development of the rural masses. Looking into its importance, a full fledged department of family planning was created in 1966 in the Ministry of Health, Government of India.

India was the first country in the world to adopt population control, as an integrated part of its developmental activities. From a mere Rs. 1·5 million in the First Five Year Plan, expenditure on family planning rose to Rs. 2,804 million by the end of the Fourth Plan. The outlay for the Fifth Plan is Rs. 5,160 million.

In the First Plan (1951–56) more attention had been given to steps to reduce population growth. The second plan (1956–61) developed research and action projects in the field of family planning as the primary emphasis of India. The Third Five Year Plan (1961–66) was to expand the educational and motivational programmes for small families. The sterilisation programme was taken up in Fourth Plan. The Fifth Five Year Plan started mainly with the population education programmes. Teachers have been assigned to develop a professional response to the problems of population with a concrete plan of action.

Population policy recently announced by the Central Government, has been widely welcomed in the country, as a

realistic and pragmatic one. The aim of the policy is to reduce the birth rate from the present 39 per thousand to 25 per thousand by 1984. To achieve this, it has been proposed to raise the age of marriage to 21 years for boys and 18 for girls, which if implemented successfully would help tremendously in making the required demographic impact.

A five year agreement involving a grant of 40 million by the United Nations Fund for Publication Activities (UNFPA) to assist India's effort to regulate population growth was signed in New Delhi, in July, 1974. The success of the family planning programme depends largely upon voluntary acceptance of the small family norm by the people.

A special scheme for education in population planning and family welfare will be undertaken by the National co-operative Union of India with a grant from the Ministry of Health and Family Planning, Government of India. Beginning from 1976, the scheme will be implemented through 500 instructors in a phased manner starting with 100 instructors in 100 districts and adding 100 more instructors each consecutive year. Totally about 29 lakh persons are expected to be trained. Each year 20,000 activities by way of seminars, debates, essay competitions, audio visual shows and talks will be organised to create population consciousness among the masses. There are 30,000 rural and urban co-operative societies which cover as much as 95 percent of our villages, 41 per cent of the rural population and 43 per cent of agricultural families.

Population control is not merely a family planning campaign, it is a compaign for healthier, better and smaller families. The main aim of the programme is to reduce the birth rate by educating the people to adopt family planning measures and accept small family norms. Family planning is thus, population planning translated in terms of the individual, family and community.

Exercise

1. Compare the physical, social, emotional and intellectual development of children from large and small families with same income.

2. Develop a story or song depicting the advantages of small family.

4. CARE OF THE AGED AND DUTIES OF THE FAMILY MEMBERS

Social institutions such as the joint family and the village Panchayat have been providing facilities for the aged in India. The problem of old person in India is not as serious as the problem in western countries where the disintegration of family and the longer span of life have created many problems of aging. The nuclear family has to face the challenge of caring for the aged adequately in spite of the other increasing responsibilities it has to face. Though joint families have started reducing in number, the aged in India are not neglected completely by the family members. It does not mean that the aged are enjoying a wholesome life. A glance at the life of aged in India presents the following problems:

(1) The physical infirmities.

(2) Emotional and social insecurity due to reduced social contacts and loss of friends as well as life partners.

(3) Lack of intellectually satisfying experiences and constructive activities.

(4) Illness affecting physical and mental health.

(5) Economic problems.

(6) Reduced social status and prestige.

(7) Lack of suitable recreational activities.

(8) Tendency of some to exert full authority and lack of understanding of modern youth who need much independence in thinking and living.

The duties of the family members

The members must have an understanding of the psychology of old age and fulfil the needs of the aged to the best of their

ability. In families where the members strive hard to make both ends meet, the aged assume a secondary place in obtaining the physical necessities. As more and more women take up jobs outside home, the aged help in child care and household activities.

On the psychological side, the members must make the aged feel wanted and give them due respect and love. Assigning the aged minor tasks in the family makes them feel important. When adjustment becomes very difficult, the aged may prefer to occupy a separate portion of the household and have their own separate household. In some other families the aged obtain just the meals from their sons, while they continue to live separately. The presence of children in the family is heart warming to most of the old people and the tie with these young children is the major source of satisfaction for them.

However, successful adjustment can be achieved only when both the aged as well as the other family members determine to succeed by mutual giving in.

Festivals and ceremonial functions in the Family

Regardless of the religion, caste and community, each family has its festivals and ceremonial functions in the family as dictated by their custom, tradition and area of living. But their objectives, procedures and frequency differ from religion to religion. Usually they consist of pooja, preparation of special dishes and sometimes even special entertainments if the community is involved. Occasionally it is even observed that the stress is on the ceremonials and the meaning behind these functions are slowly forgotten.

The family members, especially the elders need to be well-informed about the ideals and aims behind these functions and try to inculcate them in the minds of the younger members of the family. The moral education of the youth needs to be carefully considered. This needs to be part of everyday living which may be reinforced and strengthened during festivals and functions. Further the members also learn to participate in the activities which help them to be responsible, co-operative, creative and confident individuals.

Expression of one's talents gives them immense satisfaction and all these contribute to the development of a healthy personality. Further they help every person to concentrate one's mind on the Almighty, know His nature and purify one's thoughts and actions. This experience is the foundation on which the personality is built. It adds to one's mental stamina which helps him to face the challenges of life and develop a tough-minded optimistic nature to be 'calm amidst storm'.

Exercise

1. Analyse the role played by the different members in different families.

2. Study the functions and festivals celebrated in different families.

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CHAPTER V

HOME MANAGEMENT

1. INCOME AND EXPENDITURE

Income and Expenditure

Money plays an important role in the life of man as an instrument through which he can satisfy his physical, material and mental needs.

The income and expenditure pattern of the family decides the family's standard of living and its place in the society. It also decides the economic well being of the family and the nation.

Income: Income refers to that stream of money, material goods, services and satisfactions that come under the control of the family during a given period of time. It includes the salary or wages from employment, profits from business, rents from house, interest from investment, yields from lands, satisfactions from the goods and services etc.

Types of Income

Income may be classified into three types. Money income, Real income and Psychic income.

Money income

Money income generally refers to the payment received in terms of money during a particular period of time. It is the purchasing power of the family measured in currency units—that is Rupee in India. Money income may be in the form of cash payments of wages and salaries earned by the individual, rents, dividends, fees, bonus, commission, interest, profits, pension etc.

Real Income

Real income means the flow of goods and services available to the family during a given period of time. A family's real income is derived from the use of its money income. The various forms of real income are: the goods owned by the family such as house, its equipment, automobile, services rendered by the home-makers and other family members, foods produced from the garden, fuel from farm. Thus real income is obtained through spending money, through work done by members of family or through the community facilities. Real income can be direct or indirect.

Psychic Income

Psychic income is the satisfaction received from real income over a period of time. It is expressed as feelings, enjoyment, pleasure and inner satisfactions.

Sources of Income:

The main sources of family income are outside, household and social income.

1. Outside

a. *Labour*	b. *Management*	c. *Investment*
money wages, salaries, and goods obtained for certain services	money profits from business management	return from invested funds (*e.g.*) interest, rent, bonds, dividends.

2. Household

a. *Labour*	b. *Management*	c. *Investment*
goods and services created within the home by family members garden (vegetables, jam, jellies etc.)	Advantages occurring due to wise management of the house.	immediate services of capital goods owned by the family.

3. Social

Income derived from social capital and services offered by community, state and nation, park, school, railways and postal services.

Expenditure

Happiness of the family is secured by 'income-use' or expenditure. Expenditure provides the satisfaction of life for the members of the family. All expenditure for the household may be devided into 'needs' and 'wants'. The needs are those which are necessary for maintaining a healthy, efficient household, while the wants are those which may and pleasure but are not very essential for good living.

There are fixed expenses which a family must take care of and there are emergencies or special demands arising occasionally.

The regular monthly items of expenditure for most families include food, clothing, shelter, education, health, house keeping, recreation etc. Part of the income may be set aside in the form of savings for special needs or emergencies such as marriage, education, pleasure trips or sickness and old age.

There are various factors that affect one's expenditure. The actual income, size and composition of the family, occupation of the father and others, education, location of the house, health status, age level, interest and abilities of the members, the availability of goods, the price of goods, the customs of the family, the personal likes and dislikes, the general consumption pattern and the saving pattern of the family in the future.

Budgeting

Budgeting is a carefully prepared spending plan based on the actual family income. It is a plan based on previous experience, present needs and future expectations. According to Bigelow a budget is a tentative estimate of the family income and of the family's expenditure for a realistic list of items.

Budget is planned ahead for a definite period of time towards the future use. It is a statement of expected income and a plan for expenditures over a future period of time.

Importance of budgeting

Acts as an intelligent guide to spending

Helps one to spend money carefully in a planned way

Plans to determine what a family wants most

Makes one cut unnecessary expenditure

Provides for future saving

Helps one to be free from debts

Relieves the family members from worries of future

Distributes the fund according to the needs of the family

Helps to evaluate the use of money

and

Brings happiness, confidence and security over money matters.

Budget is a pre-arranged scheme of expenditure. Hence, the family understands that every paisa wisely spent is a paisa saved. The budget should be planned considering the needs of all members, and consulting the family as a whole. The budget should be simple, adjustable and suitable to the family. The income and expenditure plan varies from family to family.

The list of budget items

It is necessary to list the chief budget items to make sure that each item is attended to in the expenditure plan, while apportioning the income each family may have their own way of listing the items. The chief budget items are:

(1) *Food:* Food is the most important of all the items, since it is vital necessity. The quality and quantity of food available for the family affect their health, efficiency and happiness. Hence, the expenses on the actual purchases of groceries, meat, egg, milk, fruits and vegetables are included under this head. The expenses depend upon the existing price level of commodities.

(2) *Clothing :* Clothing expenditure depends on various faetors such as income, members, function, tastes, fashion etc. It is highly variable. The amount spent on fabrics, garments, accessories and furnishing materials come under this list. Tailoring expenses are also included.

(3) *Shelter :* The family's shelter is in no way less important than its food and clothing. The different stages of the family life cycle pose varying demands over the housing need. The expense includes the rent paid for house and repair charges if any. If the house is owned, the taxes, repairs and other incidental charges are included.

(4) *House—keeping expenses :* The general expenses incurred for running the house such as electric charges, water charges, fuel expenses, telephone charge, servant's pay, equipment etc. are included under this title.

(5) *Education :* The value the family places on education will decide the level of expenditure on education. This involve expenditure over term fees, tuition fees, extra fees, book, note books and other stationery items. Special coaching fees may also be encountered.

(6) *Personal expenses* (Sundries) : Personal expenses consume a considerable part of family's budget. It includes transport, recreation, health clubs, expenses over cosmetics and other *individual* items. If a family has to incur definite amounts regularly over certain items such as transport or health, then they may be treated as separate group..

(7) *Savings :* Savings and investment form an important part of the family budget. Regular setting aside of a certain amount goes a long way to provide financial security.

Steps in budgeting

The steps to be followed in budgeting are given below :

(1) *Estimating the income:* It is essential to know the total income of the family → the fixed expected income in cash as well as in kind. Approximation of income expected is

helpful in case of families where one cannot foresee the income specifically. Estimating the income helps the family to plan the expenditure according to the income.

(2) *Listing out the items of expenditure:* One has to take stock of the commodities and services needed and wanted by the family members throughout the proposed budget period. The list should be prepared grouping the items under each budget head.

(3) *Estimating the costs of the desired items:* It is necessary to find out the cost of the various items accurately if possible. Some charges for rent, transport, education etc. may be fixed. For the others especially food items it is essential to find out the cost of items for the present market condition.

(4) *Balancing income and expenditure:* The expected income and the planned expenditure must be balanced. It can be done by cutting down the unwanted expenses if expenditure is more than the income. If not, methods to increase the income should be undertaken.

After preparing the budget it is essential to check the plan to find out whether it is accurate and reasonable.

The success of the budget plan depends mainly on estimation of income correctly, setting the family goals accurately, and understanding the present and future needs of the family fully. Knowledge and experience can guide one in preparing budget.

The following gives an example of a budget pattern prepared for an average family consisting of (mother, father and two school going children) at various income levels.

S. No.	Items	Income group Rs. 100		Income group Rs. 500		Income group Rs. 1000	
		Amount to be spent in Rs.	Percentage to be spent	Amount to be spent in Rs.	Percentage to be spent	Amount to be spent in Rs.	Percentage to be spent
1.	Food	60	60	250	50	400	40
2.	Clothing	8	8	40	8	85	$8\frac{1}{2}$
3.	Housing	15	15	75	15	150	15
4.	House-keeping	7	7	35	7	75	$7\frac{1}{2}$
5.	Education	5	5	35	7	95	9
6.	Sundries	4	4	40	8	100	10
7.	Savings	1	1	25	5	100	10

The various budget studies have been analysed by a German Statistician by name Earnest Engle. He gave the following ideas in the form of Laws of Consumption.

As income increases—

(1) the proportion of income spent on food decreases (though the actual amount of income spent increases);

(2) the proportion of income spent on shelter, clothing and house-keeping remains practically the same;

(3) the proportion of income spent on health, education sundries (personal expenses and luxury) and savings increases.

Exercise

1. Understand the food budget of your family.

2. ACCOUNT KEEPING

The only way to determine whether or not family income is being well spent, is by keeping accounts. While a budget is a plan for future spending, accounts are records of past spending.

A household account is a record of expenditures actually incurred by the family in the course of the day, a week or month. It can include the income got by the family, the expenditure incurred, and the amount spent on each item of expenditure.

Accounts help to (*i*) show where the money goes actually, (*ii*) check the amount spent on different items with the budget plan, (*iii*) check the adequacy of allotting the income over items, (*iv*) give a basis for better planning of expenditure in future, and (*v*) to change our way of life itself (cutting certain items in the diet, or changing to low cost nutritive food, taking up extra jobs etc).

There are many methods of accounting used in the household.

(1) *The Sheet system:* It is a very simple method. Single, double or multiple sheets can be used to keep accounts. The sheet along with the pencil can be hung in any convenient place (*eg.*) back of a door or a shelf.

(2) *Note Book system:* It is a very convenient method. Either bound or loose leaf note books can be used, since here insertions can be made easily. Notebooks are especially convenient for children if they aid in account—keeping. The book should have columns to indicate the total income, the date, the account head and daily expenses. Neat recording prevents confusion. Calendar and diary are also helpful to record the accounts.

(3) *The Envelope system:* In one type, there are a number of envelopes for different budget heads. The portion of income is put in the envelope as per the budget allocation. This system is helpful for those who earn weekly wages.

In another system, a large envelope is used in which day to day bills, slips, tickets etc. are put. Later at a convenient time they can be accounted. The outside of the envelope can be used for noting down the expenses.

(4) *Card file system:* Separate cards may be maintained for income budget allocation, and expenditure over each budget

head. All expenses are entered as and when they occur date wise and catagorised under each head. Various cards can be filed together. While keeping accounts one should start simply choose a system that is easily workable make account keeping as a habit to be followed.

Account keeping is looked down upon as an irritating and a tiring job, but it should be taken as an evaluatory step in the family finance system to gauge the success and failure and plan for brighter tomorrow.

Exercise

1. Maintain accounts for the expenditure you incur on education.

3. SAVINGS

Today's income may be sufficient for today's needs but the future may bring increased need or decreased income or both. Only savings enables one to face the future demands bravely.

Savings is the result of thrift or economy exercised by the individual in his expenditure. So to say savings is the result of the wise spending plan of the individual.

Savings may be temporary or permanent. Temporary savings are designed to achieve immediate goals such as purchasing a household equipment or going for a trip during vacation. Permanent savings are set aside for future security.

Reasons for savings

(*i*) Fall in income during old age, sickness, unemployment, less pay or physical incapability.

(*ii*) Increased expenditure caused by illness, accidents, robbery or repairs.

(*iii*) The need to buy capital goods or assets like land, house, and durable goods as car, refrigerator and modern furniture and equipment.

(*iv*) For pleasure trips during holidays.

(*v*) To celebrate functions and festivals.

(*vi*) To meet the demands of higher education.

(*vii*) To invest in business or firms.

(*viii*) To gain social status and economic security.

(*ix*) To provide for a secure life for the dependents.

It is helpful in producing wealth that will yield income at a later stage. Savings gives mental satisfaction and the capital to build up the nations progressive plans.

Types of savings

Savings can be individual, corporative and compulsory.

(1) *Individuals:* Individuals have been in the habit of saving in one form or other. Traditionally people were saving their income in the form of commodities, animals, precious metals like gold and silver.

(2) *Corporative:* Corporative savings are exercised by some agencies or companies which highly help in the capital formation of a country (*e.g.*) Banks.

(3) *Compulsory savings:* When the state exercise an element of compulsion or force in making the individuals save, that is called as compulsory savings (*e.g.*) Employees Insurance, Provident Fund.

Factors affecting saving

The factors such as income, current needs of members, habit for thrift, opportunities available for saving, the provision for future, the size of the family, the standard of living, the price level, the economy of the country and the interest and willingness of the family members have a bearing on savings.

Institutions for saving

Several institutions stand ready to help a person to save systematically and to put his money to good use.

(1) *Post Office:* Post Office has been rendering banking services along with its postal duties. In the Post Office Savings Bank account an amount of Rs. 5 and above can be deposited at any time, but withdrawals are not allowed more than once a week. Deposits can be made any number of times. The reason for this restrictions is that the Post Office Savings Bank system wants to encourage savings and discourage spending.

National savings stamps are also sold in the post office in the denominations of 25 paise, 50 paise and Rupee 1. Children and students can be encouraged to buy such stamps and paste them on a pictorial savings card which is given free. This system encourages saving in small amounts.

The post office also provides time deposit accounts with varying periods as 5, 10 or 15 years, with deposits of Rs. 5 or 10 or 15. This account can be opened in any post office. This scheme is especially helpful for those who receive their income regularly.

Banks: Banks cater broadly to two types of savers. In the first category come those who save small amounts periodically and in the second those who accumulate larger surplus amounts in lumpsum. The main purpose of banks are to accept deposits, and to lend these deposits to reliable borrowers at a higher rate of interest. The accounts dealt by banks are many and varied. Savings bank account is a system where small deposits are received by the bank. Deposits may be made at any time, but interest is calculated for a minimum period of three to six months (5 to 6 percent per annum). Withdrawals can be made by presenting the pass book which is given at the time of opening account. Restrictions are often placed on the maximum amount that can be withdrawn at one time.

In the current account the minimum balance to be maintained is higher. The depositor withdraws at any time. The interest offered is very less (2 to 4 percent per annum). Withdrawals can be by cheques. It is highly suitable to business men.

In the case of fixed time deposit, the depositor withdraws the deposited amount only after a fixed time. The interest rate offered is higher usually 7½ to 9½ percent per annum.

Apart from these, banks have started some interesting profitable schemes for the common people. The Recurring deposit scheme, Kamadhenu scheme, Prize deposit scheme, Double benefit scheme, Small saving prize deposit scheme are some schemes offered by the banks for the welfare of the people.

Piggy bank accounts are opened in the banks to inculcate the habit of savings among children. Some banks provide safety lock facilities to keep the valuable articles safe. Loans are advanced to agriculturists and other small scale industries to improve their fields.

(3) *Insurance*: Insurance agencies play an important role in savings. It is saving collectively instead of individually. It involves the setting aside of sums of money in order to provide compensation against loss resulting from particular contingencies.

Life insurance is a contract between an individual called the insured and the insurance company. Here the insured makes a money payment (premium) every year or at intervals to the company. In return the company agrees to pay a certain amount after a specific period or at the death of the insured to a third party known as beneficiary. This contract is known as policy.

Life insurance is a provision made by a person through adequate savings in his life time towards his family. In the case of the death of the insured too, the family can lead an economically secured life. There are various forms of life insurance policies at present.

In limited payment policy, the payments are for 10, 15, 20 or 30 years as agreed upon.

The endowment policy enables a person to accumulate a fund of money which will be available to the individual at a

specific date of maturity like marriage, education, house-building etc.

Casuality insurance is given against fire, accidents, health hazard, automobile accidents and so on.

Life annuties can be bought for oneself or for some one else. Premiums are paid for a given number of years. When the policy matures the company pays back a particular amount for a stipulated period of time.

(4) *Provident Fund Scheme:* Provident is a type of help given by the government to employees who save regularly. Here the employee has to save a certain amount of money in his factory or place of work from his salary every month. The total amount will be paid back with interest at the time of his retirement. In contributory provident fund the government will add the same amount of money which the individual has deposited. This is a matching grant. Partial withdrawals on restricted scale are also allowed.

(5) *Chit funds*: Chit funds are ancient forms of accumulating surplus both in cash or in kind. In chit funds members are expected to contribute fixed amounts regularly on a monthly, quarterly or half yearly basis.

Chit funds provide a ready means of getting a lumpsum which can be utilised for some special purposes, while payments are in instalments. There are different varieties known as lottery chit, the auction chit and so on.

(6) *Nidhis:* The origin of Nidhi scheme dates back to the 18th century when a fund for officials in Madras was created to save them from the money lenders who charged very high rates of interest. The officials decided to start a fund of their own which would offer needy persons with fixed incomes an opportunity to borrow at reasonable rates. The objectives of Nidhis are to :

1. afford facilities for saving;
2. give relief to members from the burden of old debts;
3. grant loans for special purposes.

(7) *Others:* Apart from these there are Saving Bonds, Defence Deposit Certificates, National Saving Certificates and the Unit Trust of India investment are schemes undertaken by the government to promote savings.

As the saying goes, 'Little drops of water make the mighty ocean', so the little savings of the individual in the society would create a lumpsum for Nation's developmental activities.

Exercise

1. Make saving a habit. Start an account in your name in the nearby bank or post office.
2. Have a meeting with LIC officer to know the various recent schemes they have.
3. Write about saving Institutions. What is life insurance?

4. SUPPLEMENTING FAMILY INCOME

The problem of insufficient income is so great in our country that many families fall with in the poverty line. It is essential in the grave context of unemployment, underemployment, and population explosion that every one must work hard with high vision, so that our standard of living will be high.

Supplementing or enhancing family income is being very much possible if one takes up certain activities during the leisure time. Subsidiary occupations are activities which augment the main income, and thereby help to utilise their leisure. Leisure time available to certain group of people can be fully made use of by such creative activities. Especially in rural areas people are not employed during the off season. To them subsidiary occupation is a boon.

Kitchen gardening, poultry keeping, dairy farming, goat rearing, basket making, book binding, cartoon making, various craft works, embroidery, garment making, drawing and painting, doll making, spinning and weaving are a few of the subsidiary occupations one can take to enhance the family money income.

A part from this the family's real income can be improved by the wise management of the family. So that thrift is followed in spending money. A homemaker needs to be a wise manager in planning the expenditure, investing in savings for the future etc. to meet the varying needs of the members.

The family members can contribute their share of 'labour' to the family so that they avoid engaging outside help for their family jobs—as household work, tuition, marketing, baby care, care of sick, sewing etc. The members can produce their own pickles, jam or other preserved foods as well as prepared foods instead of spending extra coins to buy the same from retail sellers or hotels.

Such early concepts in economy, practising self-help and wise use of leisure etc. pay dividends in enhancing the families money income as well as real income.

Exercise

1. Maintain school vegetable garden and have records of expenditure and income. Visit a poultry farm and dairy farm.

5. FUELS AND OVENS

The more economical, convenient, clean and attractive the kitchen, the greater is the satisfaction it gives to the housewife. Wise selection of fuels and oven help to conserve time and energy of the homemaker and induce economy in family finance.

Fuel is a material which on being oxidised or burned furnishes heat energy at a reasonable cost. All fuels contain the basic combustible elements carbon and hydrogen along with the non-combustible materials such as mineral salts, carbon dioxide and moisture.

A good fuel should be strongly exothermic, inexpensive, easily storable and transportable and the products of combustion should be easily disposable. It should not require expensive

stoves, keep kitchen clean, consume less time to cook and the food tastes better. The value of fuel mainly depends upon the heat producing capacity per unit mass.

Fuels fall under three major categories solid, liquid and gaseous which are either naturally occurring or manufactured.

Solid fuels—Wood, coal, charcoal, coke

Liquid fuels—Petroleum, kerosene, paraffin oil, animal fat, vegetable oil

Gaseous fuels—Methane
Electricity
Solar energy

(1) The traditional chulah

In India this is the commonest type in most parts, but rather old fashioned. It stands on three stones holding any type or size of vessel over it. The fuel burnt in this chulah is usually pieces of wood and twigs. Firewood makes a better and rotter fuel compared to other fuels which can be used in the chula as saw dust, waste paper, cowdung cake, husk, coconut shells and other organic waste.

When considering wood, some burn quickly and steadily for a longer time. The wood if well dried and cut into desired pieces before use, is convenient. When one end of a piece of wood is burnt an oily liquid can be seen to ooze out at the other end. The more the oil in the wood, the better it burns (*e.g.*) Eucalyptus. Expensive wood is never used unless it is decayed. Commonly tamarind, margosa, mango tree are utilised. People who are not to be bothered with the use, care and maintenance of oil, gas or electricity feel it highly convenient to use firewood. It is freely available in many parts of rural India. It comes handy in quantity cooking at festive occasions and at emergency when gas, electricity are in short supply.

The disadvantages of using wood are:

It is difficult to kindle and when wet does not burn properly. Transportation and storage may be a problem. Storage place may be a breeding place for ants, white ants, and reptiles.

Certain types of firewood gives out smoke. Smoky kitchen suffocates the worker. The kitchen as well as vessels are darkened with soot and smoke from firewood. Cleaning the dirty vessels may be a problem to the homemaker.

Proper chimneys need to be constructed to let out smoke on the kitchen.

(2) Smokeless chulah

The ordinary traditional chulah was made more scientific, efficient, and economical by evolving smokeless chulah. Redclay, cowdung and hay are used to set the platform. The pot seats are scooped out. There is passage between the pot seats, large enough for the flame to pass. The smoke is drawn out through the chimney hence kitchen can be maintained smokeless. Usually there are three pot seats, at one end the fuel is fed. If any pot seat is not used, it must be covered to prevent the smoke escaping from it.

(3) Charcoal Sigri

The charcoal sigri is made up of iron. If the room is not well ventilated there is the danger of carbon monoxide poisoning. The stove is not costly and has the advantage of producing less smoke.

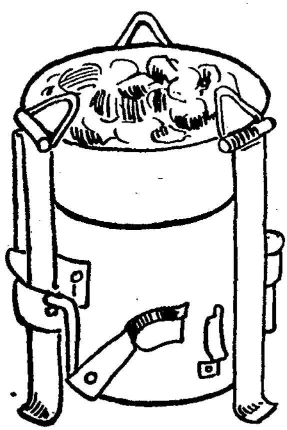


Fig. 15 Sigri

Coal is the startified mineral formed by the action of decay, heat and pressure upon vegetable and wood matter laid down for centuries. It is dug out from underground. It is heavy and strong. Coal is not widely used for cooking purposes. Lignite is a form of coal. Leco, the commercial product of lignite catches fire quickly, smokeless, odourless and economical.

Charcoal is widely used for domestic cooking. It is the charred remains of heated wood. It is black and brittle. It is very easy to light and when lit it burns intensely glowing red. It needs 'fanning' often to secure a uniform heating.

Coke is prepared from coal. It is the residue obtained by heating coal out of contact with air. It is cheaper than coal. It gives out much heat. It burns slowly and steadily without much smoke but igniting coke is difficult.

(4) Oil stove

In the market several oil stoves are available for cooking. They are economical, portable, can be easily lit and well managed. They are available in various size and shape. Liquid fuels are obtained from vegetable oil, animal oil and petroleum. Kerosene is widely used. Clean kerosene oil should be used. The kerosene stove does not burn the liquid kerosene right away but only burns the vapour of kerosene which is produced by heat. The result is a blue flame which give out intense heat.

Special care is needed to keep them clean and in good order. The odour of kerosene oil will otherwise make the food unpalatable. Their efficiency depends upon how regularly wicks are trimmed, oil is fed and the stove is maintained.

(5) Gas stove

Coal gas, acetylene, water gas, natural gas, liquified petroleum gas and cowdung gas are all gaseous fuels. The gaseous product of coal tar distillation is commonly used as gas for cooking.

Cooking in gas stoves are efficient, easily regulated and easy to clean. It is convenient and economical in the long run. A short piece of special tubing connects the cylinder carrying the gas appliance. The cylinder contains the liquified petroleum gas. When the cylinder valve is opened, the evaporated gas passes through the regulator to the stove. The regulator ensures supply of gas at the required, correct and constant pressure.

Gas stove saves times and energy for the homemaker hence, labour saving. It does not produce soot under the cooking utensil, since there is no smoke. It helps the kitchen to be

maintained neat, tidy and modern. It is helpful in quantity cooking in hostels and hotels.

Gas is available in major cities and towns of India and its use is becoming a necessity to the homemaker who wants to save time and energy.

Gas should be handled carefully since it can cause carbon-monoxide poisoning, hence leakage of gas should be prevented.

(6) Cowdung gas

The use of cattle dung to produce fuel is a recent origin. Aerobic fermentation of cattle dung in specially constructed plants produce biogas as well as manure. Methane 60% and hydrogen 40% are the main combustible constituents of biogas. Along with animal dung, plant waste and other organic wastes can also be mixed.

It can be used conveniently in rural areas. Biogas burns with a smokeless blue flame.

The various uses of cowdung gas are the high calorie values of fuel; cheapness of fuel, high nitrogen content of the manure after fuel production, hygienic and sanitary kitchen.

(7) Electric range

When a current of electricity passes through a conductor, heat is produced. Electric stoves are heated by coils through which electric current passes. It is superior to other forms of heat for cooking. It is convenient, efficient and labour saving. Appliances such as electric heaters, hot plates, kettles and toasters are coming into common use. A small electric oven is an excellent investment to those who can afford it.

The absence of smoke, smell or ash and possibilities of ready adjustment and regulation are the advantages of electric devices, where electricity is plentifully available, it is not expensive to operate.

Unless they are well constructed and fitted there is the danger of getting electric shock. In India due to the high cost

of electricity, electrical equipment, scarcity of electricity and fear of accidents while using electricity, it is not commonly used as fuel for cooking, but still its use is becoming popular nowadays.

(8) Solar cookers

The advancement of modern science has made available many techniques for tapping the different potentials of energy and utilising them for increasing fuel needs. Many cooking devices utilising the solar energy have been developed at present. One such is solar oven has been received considerable attention. The reflector solar devices taken many sizes, shapes and materials of construction. The solar oven properly constructed can deliver temperature as high as 450 degrees. In a tropical country like India, the wide use of solar ovens should be enthused with proper results to suit urban and rural or high and low income families.

The solar cookers can be used to boil rice and dhal; bake biscuits and roast groundnut.

Solar water heaters are used for the provision of hot water for domestic purposes. Solar heated water may be sufficient for bathing, dishwashing and cooking needs of the family.

Labour Saving Devices

Advances in science and technology, growing individualism and economic stress have created the need to modify certain practices in homemaking. Homemakers today have various responsibilities besides attending these normal household choreses —especially if she is a homemaker cum wage earner or social participant.

Normally the homemakers spend much of their time in the kitchen. It will be helpful if they can save steps, energy, money and time in several ways in the kitchen.

Labour saving devices both electrical and non-electrical are increasingly utilised by the homemakers at present.

The labour saving devices are appliances which helps to get a job done in the best possible way with the least expenditure of time and energy. They minimise greatly the strain in the household work and increases leisure in the house. They can make use of the available time for better services of the home or community. When paid household help is scarce, the labour saving devices become a boon to the homemaker. Especially the electrical appliances have made a complete change in the physical set up of the kitchen.

The use of labour saving devices greately depend upon the family size, family composition, income, employment nature and health status of the members.

The various labour saving appliances are coffee percolator, rotatory beater, grater, slicer, peeler, mixer, grinder, cookers, range, toaster, kettles, ovens, water heater, irons, refrigerator, vacuum cleaner, hay box, janatha refrigerator etc.

The physical principles such as force, friction, wheel and axle system, lever and steam power are applied in the working of labour saving kitchen devices.

For example for the peeler, slicer and grater, principles of lever, force and friction are applied, in the case of rotatory beater, principle of wheel and axle is applied.

In general while selecting labour saving devices the following points are to be considered :

(*i*) easy to operate

(*ii*) clean

(*iii*) good quality products

(*iv*) safety in use

(*v*) multipurpose action

(*vi*) durability

(*vii*) type of material used

(*viii*) guarantee

Exercise

1. Evaluate the various fuels and ovens.
2. Visit a cowdung gas plant if available near by.
3. Make a list of labour saving devices available. Understand the working of a few labour saving devices available to you.
4. Make a hay box, and cook rice using the same.
5. Arrange demonstration class with the salesmen of electrical devices.

6. HOUSEHOLD PURCHASES

Purchase of food stuffs and other items should be done systematically. One of the factors in controlling money management is to get the best value for the money without sacrificing the quality of the commodities purchased. Economy should be key note while purchasing.

When one plans for the purchase the knowledge of the commodities is usually acquired through market inspection, experience in purchasing, neighbours and friends, salesmen's canvasing, advertisements and window display.

The following points are helpful in wise purchasing:

Take account of what exactly one needs.

List out the quantity which one wants to purchase.

Specify clearly the type or quality of the commodity.

Understand the source of purchase.

How to purchase

Always shop yourself.

Compare the prices of commodities in different shops.

See to the quality for satisfaction.

Buy always fresh food stuff or new stocks.

Buy in limited quanity if perishable or in large quantity if it can be stored for long time.

Read the labels clearly and follow the instructions if it is a packed item.

Scrutinize the trademarks which specify weight, quality, date of manufacture, date of expiry etc.

Enquire about the rules of guarantee given by the authority.

Be cautious of misleading advertisements which are used for promoting rational buying.

Buy by weight or in numbers and not by bulk. Check if possible the weights and measures.

Purchase in cash whenever possible. Credit buying may lead to purchasing beyond the capacity for repayment—go in for credit purchase if it is worthwhile.

Avoid buying already prepared items (food item, ready-made garment etc.) because they may be costly.

Always go in for quality goods with Indian Standard Institute certification mark (ISI), or Agmark for agricultural products.

When to purchase

Buy food stuffs when they are in season.

Try to procure goods cheaper at reduction sales. But check whether the sale is genuine and not offered just to get rid of the old goods. They may compromise on quality. If the reduction is offered to boost up production and to introduce a new good or sentimental, one can make use of the opportunity.

Buy when the prices are low. Proper speculation is essential to know when the prices will be increasing during a fluctuating period.

Buy in a day light as far as possible. Morning time is suitable for buying vegetables and fruits in fresh condition.

Where to purchase

Buy always from licensed or authorised dealers.

Always get goods from co-operative stores or fair price shops.

Never encourage social evils as black marketing, hoarding, adulteration, inflation etc.

Buy from wholesale producers or manufacturers if possible.

Shop at a place where they issue bills.

Make sure that the buyer does not suffer from price disadvantages due to the location of the shop, the type and services offered, go into a place where they receive complaints and are always ready to satisfy the consumer with their courteous services.

Exercise

1. Plan ahead for marketing by preparing a list. Shop yourself with classmates to carry out a project of preparing meals.
2. Note the malpractices indulged by the shopkeeper. Take precautionary measures against it.
3. List out ISI marked and Agmark food items available in the markets.
4. Make an enquiry into the working of any co-operative stores in your area and whether it is worth to become a member in it.

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Chapter VI

CLOTHING

1. CLOTHING SELECTION

Clothing our families in recent years poses greater challenges than ever before. Varieties of fabrics are available today in the market, with new constructions, texture and finishes. It is essential to possess a knowledge of textiles, to be able to make the right choice for the available money to give satisfaction for family members.

In the selection and purchasing of clothing, the out look of family towards clothing must be considered. For some, clothing may serve only the functional necessities, while for others it may be an outward expression of personality. Physiologically, clothing is essential, to protect the body during winter and summer, comfortable clothing which also fit the individual give him a good appearance.

Clothing also gives an impression about the individual in the society. Children for example, if they are not well dressed find it hard to get accepted in their peer group. Certain standards of clothing are to be maintained even for elders if they want to find a place in the society.

To the wearer himself clothes offer a feeling of security and confidence. It gives aesthetic satisfaction, happiness and some contentment. It is also an outlet for self-expression. Changes in moods and minds of individuals are reflected in clothing some appear worried, nervous and uncomfortable and poor dressing habits may be the cause. They may be, less friendly, self-conscious, less confident and may feel inferior to others. A person well dressed, would feel relaxed, comfortable, confident, happy, healthy and friendly.

The amount of family income available for clothing is influenced by many factors. In lower income groups the per-

centage of money available for clothing purchases is as low as even eight percent, whereas in higher income groups even as high a percentage of forty is spent on clothing. Very often expensive clothing items are selected particularly for weddings and festive occasions. Very often ornaments and accessories of high cost are purchased, as the family has to maintain certain customs and standards. Purchasing materials paying such exhorbitant amounts is not always wise, as it might lead to financial difficulties.

The selection and purchasing of clothing items is influenced by many factors. The family location and the extent of participation of the members in social activities must be considered. If the family lives in suburban areas, or perhaps in rural areas, the needs of the members may be different.

The occupation of the members must be taken into account. A person going to an office may need a different costume when compard to one who goes to a factory or foundry. The needs of a professional woman are very different from that of the housewife.

Family size is another factor that influences the purchases. Larger the size of the family, the available clothing rupees will be limited unless a larger percentnge of money depending on the family income has been allotted. The smaller the size of the family, greater is the fiexibility for clothing purchases, as a larger sum is generally available for clothing purchases.

Climatic conditions create differences in clothing purchasing habits. In very cold climates winter clothing must be provided. Suitings in woollens, sweaters, shawls, full handed cardigans are expensive items.

The investment of the clothing money at initial stages becomes heavy. On the other hand in warm climates frequent replacement of clothing items becomes necessary as they get affected by perspiration.

Age, sex and tastes of individuals are the other influencing factors. What the teenager wears cannot be worn by the elders.

The older generation generally prefer subdued colours and not the striking colours. Smaller prints are preferred. Elaborate designs and too deep brighter shades of colour are avoided, soft smooth textures are preferred to rough hard textures. Clothing items are different according to the sexes. Boys cannot wear the same garments the girls or ladies wear. Individual differences and tastes influence clothing selection to a great extent.

Besides the above factors the personality of the individual must be taken into consideration. Personality includes figure types and personal expressions. The individual can be of the dramatic or athletic type or of the feminine type.

The personality traits must be considered in the choice of clothing since clothes may enhance the personality, subdue it or even dominate. An elaborate bright attire may not suit dainty figure types. Soft smooth textures and dainty colours may not suit the athletic types. Bold and enlarged figures in designs suit the dramatic type.

A person can possess any figure type. Individuals can be tall and slender, or they can be short and stout. Tney can be tall and stout or even short and thin. The figure types must be considered in the choice of clothing. For a tall and slender person broad bordered sarees would look nice. Horizontal stripes can be recommended. Large designs in sarees with bright colours will suit her. For a person who is short and stout thin prints are better. Small borders would look nice. Verticial lines in dress of sarees would make the figure look tall. Contrasting colours can be avoided. For tall stout figures sarees should be selected carefully. Width and length of sarees must be checked before buying. Designs must be so chosen with suitable colours which do not enlarge the figure. For short but thin persons, designs which are broad, and medium sized can be chosen. The complexion of the individual, the texture of the skin, and the general appearance of the individual must be considered in the choice of clothing. Very dark complexion person can wear light shades of colours. Darker colours suit the fair complexioned persons as their colours emphasize the complexion further. For a rough masculine type of figure



Fig. 16. Sari with horizontal stripes suitable for a tall person



Fig. 17 Sari with vertical stripes suitable for a short person

or very stout person, thin georgettes, or transparent tender fabrics may not suit, as they may further emphasise the characteristics.

In the selection of designs the features of the face can be considered. A square neck dress emphasizes further the square face. This can be avoided.

For a long face the design can be such that it conceals the length of face. For a round face a square, V or even a boat neck may suit. So depending on individual variations in figures dresses must be selected.

Clothing must be selected according to the occasions also. For festive occasions—bright cheerful colours can be selected. For travelling dark and subdued colours will help. While for day to day wear, depending on the activities, lighter or darker shades of colours, smooth or rough textures can be selected.

Colour combinations must be suitable and attractive in the choice of clothing. Colours must be combined effectively to produce attractive outfits. A knowledge of colour and combining colours will help the wearer. At times, in textile materials very attractive combinations are possible without following any colours systems.

In the purchase of clothing materials for the family, the budget or available money for clothing must be considered. For the different family members, the outfits on hand must be. listed out and further purchases must be done. The purchased materials or garments must suit the wardrobe on hand. The items to be discarded must be listed out separately and kept aside as they connot be used. The selection must be made intelligently and economically. A piece of dress may go with two other dresses. It may be wise to choose such an item to make the wardrobe adequate and workable instead of purchasing a new item.

It is wise to make planned purchases as purchases made without good planning or thinking may become an unnecessary expenditure. It is not essential to spend a lot of money to be well dressed. With minimum expenditure a wardrobe on

hand could be made complete and wholesome. Clothing budgets generally help in making wise purchases. Price of the commodity must be considered. It may be wise to pay a rupee more and get a better outfit rather than pay less and go in for a poorer material which might run the colour or crock.

A variety of fabrics and outfits are available in the market. Fabrics of different constructions are available. Some are knitted goods, some are felts, and there are non-wovens too. The market is flooded with a variety of woven materials. It is essential to learn the different varieties and choose the right type of material for the right purpose.

Some hints on shopping can be practised. The fabric can be checked for the weaving done. It can be rubbed and if the colour adheres to finger it may run colour. It can be touche.. by hand and examined for the texture. Whether any sea.. are present in the fabric can be examined. These must be read before purchasing the material. Some of the details of information that are printed may be examined before purchasing.

These will give an idea as to what type of material it is and where it is produced and what type of finishing it has undergone. It is better to purchase out of season particularly in off season sales. Some times reduction sales may be proclaimed by producers and this is a good time for making purchases as we may have to pay only a lower cost. Woollen materials can be purchased during summer, when they may be found cheaper than winter. In shopping, at the beginning it is better to go round and do window shopping and locate the purchases to be made. At a time when the business is dull during the day it is better to go and make the desired purchases. It is better to check the materials before purchasing, as after purchasing it may not look appropriate to return the articles to the customer.

Hence, in the selection of clothing fabrics we must consider the following points :

1. Is the fabric or clothing item within the budget and is it of reasonable price?

2. Will the fabric suit the figure and complexion ?

3. Is it pleasing and attractive?
4. Does it have a good colour scheme, texture and design?
5. Will the fabric be serviceable in the long run?

Storage

A knowledge of storing clothes is highly essential for every individual. Clothes may get destroyed, by insects, rodents or they may get affected by dust and atmospheric dirt. In humid weather they may be subjected to fungal infestation also. Therefore some steps must be taken to store clothes.

Clothes can be stored in steel trunks or steel cupboards. Paper or cardboard trunks are not satisfactory as many insects breed in such boxes. Wooden cupboards are good if they are free from any holes or crevices.

Whatever may be the container, it should be cleaned and aired before storing clothes. It is better to spray them with insecticides. Shelves of cupboards must be lined properly.

The clothes to be stored must be absolutely clean. Woollen must be dry cleaned. Cottons must be washed and ironed well and they must be free of starch as starch is eaten up by insects. Worn garments must never be stored. Steel cupboards may have devices to hang clothes. Suitable hangers can be used and coats, suits and shawls can be stored by hanging in rods present. It is better to protect costly items of clothing with covers. Newspaper is good for this purpose as the smell of the printing ink is disliked by insects. Clothes must be stored in dry condition only. To prevent insects, powdered neem leaves made into packets can be inserted between clothes. Napthalene balls or flower dust can be used. Tobacco, camphor and moth balls also can be used. But the above should not be used in excess as the repellents generally have a deteriorating effect on fabrics.

Exercise

1. What are the factors to be considered while selecting clothes for the family members?

2. Visit the nearby shops, survey the materials available and compare the costs.

3. What are the factors to be considered while storing the clothes?

2. STAIN REMOVAL

Home laundering is a pleasure, provided one knows the art of removing stains. Otherwise, it becomes a great worry. What are stains? How to remove them?

Stains are nothing but discolouration caused on fabrics due to the deposition or absorption of some foreign material. Stains may cause an unpleasant odour or spoil the appearance of a garment. Hence prompt removal of stain is of primary importance. The chances of complete removal lessens as time goes by and old stains are sometimes impossible to remove.

Stains are varied and many. They can be classified as:

(*i*) Animal stains :— (*Eg.*) blood, egg, milk and meat

(*ii*) Vegetable stains : - (*Eg.*) tea, cocoa, coffee and fruit juice

(*iii*) Grease stains :- (*Eg.*) butter, curry, oil paint, varnish and tar.

(*iv*) Dye stains :- (*Eg.*) dyes, ink

(*v*) Mineral stains :- (*Eg.*) iron, mould, medicine

(*vi*) Perspiration.

(*vii*) Grass.

Sometimes, the nature of stain may be unknown. In such case, it is difficult to identify the stain.

The following are the general rules which anyone may follow, whether or not she knows the nature of stains.

(1) Soaking the stained material in warm water.

(2) Applying a mild soap on the stained area.

(3) Treating with mild acetic acid solution.

(4) Bleaching with a harmless bleach like hydrogen peroxide.

Precautions to be taken:

Analyse the composition of material. No unknown material should be treated with a strong bleaching agent or exposed to bright sun light. Bleaching should be done as last resort. No fabric should be steeped in the solution after the stain is removed.

Method of removing stains: *(applicable for all fabrics)*

I. **Animal Stains:**

blood, egg, milk and meat juice	Soak the material in acetic acid solution (15%) for about 2 hours. Wash thoroughly in cold water and treat with dilute ammonia solution to neutralise the effect of acid.

II. **Vegetable Stains:**

(*a*) tea, coffee and cocoa	Steep in warm water and wash with mild soap. (use boiling water for cotton)
food stain	Wash the material with mild soap and bleach with Javelle water.
(*b*) fruit juice	Steep in alkaline solution and wash with warm water.

III. **Grease Stains:**

butter, curry oil	Scrape off the stain. Place the stained area over an absorbent paper and place hot iron over it.

	(Since synthetic materials cannot be ironed, use grease solvent.)
(liquid) grease stain	Wash with hot water and soap if the material is cotton or linen. For all other materials, apply grease solvent (petrol) on the stained area. Place it between two absorbent papers and press well.
tar	Scrape off any thick tar. Treat the material with a grease solvent·
paint	Steep the material in turpentine and wash with mild soap.
varnish	Steep in methylated sprit and wash with warm water.

IV. **Dye Stains:**

dye	Steep in spirit and wash with a milk soap solution.
blue ink	Soak the stained area in lime juice or curds overnight. Wash thoroughly in water.
	Spread salt or lemon over the stain and pour boiling water through if the material is cotton. Otherwise use warm water.
	If the stain remains, bleach with a mild bleaching agent. (hydrogen peroxide or borax).
red ink	Steep in Borax. If the stain still, remains, bleach with hydrogen peroxide.
blue (ultramarine blue)	Steep the material in water to which a few drops of acetic acid is added

and bleach with a mild agent, like hydrogen peroxide.

V. **Mineral Stains:**	
iron rust	Spread salt or lemon on the stained area and rub gently or wash the material in water to which few drops of oxalic acid is added. If the stain remains bleach with hydrogen peroxide.
black ink	Soak the stained area in curds or lime juice overnight. Wash well in warm water. (Boiling water can be used for cotton).
medicine stain	Soak the stain in surgical spirit and wash the material in water to which few drops of acetic acid is added.
javelle water contains	1 lb. washing soda in 1 quart boiling water, $\frac{1}{2}$ lb. chloride or lime in 2 quarts cold water.
VI. **Perspiration:**	Wash the material with Javelle water and bleach in sunlight if it is cotton. Bleach all other materials with hydrogen peroxide.
VII. **Grass:**	Steep the material in methylated spirit and wash well with cold water.

Exercise

1. How will you treat the unknown stain?
2. Give the classification of stains.

3. Describe the methods of removing the following stains.

   (*a*) Blood

   (*b*) Food stain

   (*c*) Grease stain

   (*d*) Tar

   (*e*) Blue ink

   (*f*) Iron rust

3. LAUNDERING OF COTTON, SILK AND WOOL

Laundering is the process by which dirty clothes are made clean and tidy. It includes washing and ironing. Laundering may be done in the home or in a commercial laundry. General household items may be sent to a commercial laundry, while finer things are done at home.

The importance of washing the clothes

The importance of washing the clothes is to remove the dirt to give good appearance, to remove foul smell, to kill the harmful bacteria that are present in the clothes.

There are different kinds of dirt found in clothes. They are sweat, salts like ammonia, sugar, acids found in the sweat, Food stuffs fall and spoil our clothes. Coffee and fruit stain, dust and smoke may also settle on our clothes. It will create a great surprise when we wash our dirty saree or woollen clothes after a few days. When these dirt are all removed from the clothes, it looks clean, the colour does not fade, nor shrink and it is good to look at.

Sometimes while cleaning the clothes the salts and water get mixed and form a paste which instead of whitening the clothes, they dirty them. So such waters should be made salt free and then made use for washing the clothes.

General rules for washing

Many methods are there for washing clothes. The method used in washing clothes depends upon the article, its fibre content and construction of fabric. Before starting the actual washing, the dirts and soiled clothing items should be collected. These clothing items should be examined thoroughly for wear and tear and the necessary mending should be done. After mending, the stains and spots, if any, should be removed by suitable stain-remover. Then non-washable trimmings such as metal buttons etc., are removed and pockets emptied. The garments then should be separated according to fibre-content, as cotton, silk and wool. In addition, the light coloured items are separated from the dark coloured items, in order to avoid the dye stain sicking on to the white or light coloured material. Again the more-soiled ones like those, handkerchiefs are seperated from the less soiled items like blouse.

Equipment required for washing:

(*a*) buckets
(*b*) tubs
(*c*) wash board
(*d*) plunger
(*e*) soapnut or reeta nut, soap
(*f*) hot water
(*g*) cold water
(*h*) blue
(*i*) starch
(*j*) baskets
(*k*) ropes and rods
(*l*) laundry clips
(*m*) iron box
(*n*) ironing board
(*o*) hangers
(*p*) scrubbing board
(*q*) washing place

Schedule for washing clothes:

(*a*) Once in a week, a day should be allotted for washing clothes. On that day, the other activities of the household should be minimised. If one day is not enough to wash the clothes, two or three days can be allotted to do the work.

(*b*) Soap, vessels and other materials should be collected and kept in a place. Soiled clothes should also be collected and kept near the soap and other materials.

(*c*) Inside the house or outside the house, the clothes should be washed in a well lighted and airy place. If clothes are to be washed inside the house, the sink can be constructed at window level to get enough light.

(*d*) Proper water supply and a good, airy place are necessary for washing and drying clothes.

To avoid fatigue and tiredness, a convenient working height is essential for cooking foods and washing clothes. Figures 18 A, B show the correct and wrong methods of washing clothes.

Collecting and sorting soiled clothes

Dirty clothes should be put in a basket, bag or box. Soiled clothes can be classified into four types. They are less soiled white clothes, more soiled white clothes, less soiled coloured clothes and more soiled coloured clothes.

Apart from these, woollen garments, silk and clothes to be washed in hot water should be sorted out. Children's garments should be washed separately, Heavy articles should be separated from light materials. Collar, embroidered clothes and new clothes should be sorted out and washed separately.

Preparation for washing

Articles in the pockets should be checked before washing. Betel leaves, pencils, pins, needles and the like should be removed from the pockets. Before washing, the torn parts should be mended properly and the broken buttons should be removed.

Steeping: The dirt in the clothes are easily removed by steeping them in the water. Clothes expand in the water and loosens the dirt particles. Water penetrates inside the clothes and removes the dirt. Therefore, it is essential to steep the clothes for sometime before washing. Steeping helps to remove 40% of dirt from the clothes and reduces the amount of soap to be used for washing. Clothes should not be steeped



Fig. 18 A. Wrong method



Fig. 18 B. Correct method

Fig. 18. A, B. Methods of washing clothes

for a longer time because it will produce bad smell and destroy clothes.

Blueing: Blue is used to remove the cream or yellow colour of the white clothes. Blue cannot give white colour or cannot change the colour of the garment but it can whiten the white garment.

There are four kinds of blue available in the market. They are:

(*i*) Ultramarine blue—This is very cheap and adds white colour to the white clothes.

(*ii*) Asur blue —This is very costly one.

(*iii*) Prussian blue —This is not a good one. This leaves a rust like stain on the garments.

(*iv*) Indigo blue —This is prepared from the stem and leaves of indigo plant. This leaves a green stain on the clothes.

Blue will not dissolve completely in water. Blue should be tied in a piece of woollen cloth and immersed in water till the water gets a sky blue colour. Since blue easily settles down at the bottom of the container, the water should be stirred and used. Clothes should be immersed in the blue water and removed immediately. If there is an excess of blue in the garment, it should be put in water mixed with little vinegar and dried.

Starching: Clothes will stand stiff without crushing and gives neat appearance if they are starched properly. The dirt sticks on the starch and it is easy to remove the dirt from starched clothes. But it is difficult to wear too much starched clothes in summer.

Preparation of starch: Rice flour, maida, potato and tapioca are suitable for the preparation of starch. Rice flour is suitable for preparing the starch.

METHOD I—Ingredients

Flour	—	3 teaspoons
Cold water	—	9 ,,
Borax	—	½ teaspoon
Candle	—	½ ,,

Mix borax and flour in cold water with the help of a wooden spoon. Add hot water and stirr till a clear fluid is obtained. Stir with candle thrice and cover with a cloth.

METHOD II—Ingredients

Flour	—	3 teaspoons
Cold water	—	¼ litre
Borax	—	½ teaspoon
Hot water	—	½ ,,
Candle	—	½ ,,

Mix flour and borax with cold water. Add hot water and stir with a wooden spoon. Stir three times with candle and add cold water. This prevents the spreading of scum on the surface of starch. Borax gives a shining appearance to the clothes. Candle prevents the clothes sticking on the iron box.

The starch prepared will be thick in consistancy. Therefore according to the nature of the clothes, it should be diluted. Heavy clothes need thin starch and light clothes need thick starch.

Nature of cloth	*Thick starch*	*Water*
Light clothes	1 part	1 part
Flowered clothes	1 part	3 parts
Table linen	1 part	4 parts
Saree	1 part	8 parts

Bleaching : Bleaching should not be used regularly. Bleaching should be used to remove some unknown stains and remove

the colour. The clothes which are kept inside the box for a long time develops an yellow colour which can be bleached. Sunshine bleaches the clothes naturally. If chemicals are used to bleach, they should be rinsed thoroughly. Hydrogen-peroxide and oxalic acid are used to bleach the clothes.

Calcium chloride	—	½ lb.
Hot water	—	1 litre
Soda	—	1 ounce

One mixture with the above contents should be diluted with water and used. One part of the mixture should be mixed with four parts of water and used. Several bleachers are available in the market. They should be used very carefully according to the instructions give in them.

Drying: Sundrying will bleach the colour. Therefore, coloured clothes should be dried in shade. Clothes which need ironing, starching, clothes which should be dried on the ground, clothes which should be removed while still they are damp and the like should be sorted out before drying.

The ropes or rods used for drying clothes should be very clean. If it is iron rod or rope, it should be free from rust. The rope or rod should be in such a place where there is good ventilation, air and light. Wooden clips should be used to hang the garments. The clothes should be dried in their original shape. This will make ironing and folding very easy. During rainy season, clothes should be dried in a verandah, terrace and the places in which there is plenty of air and light. The drying place should be away from dwelling place because damp clothes will cause cold to the people.

Ironing: Heavy clothes, woollen garments does not need any ironing. Other clothes should be ironed while they are damp.

(*a*) *Moistening:* Clothes which need ironing should be spread on a table. Hot water should be sprinkled on the cloth with the help of a brush or hand. Sprinklers can also be used to sprinkle water evenly on the garment. The cloth should be folded and kept for 30 minutes.

(*b*) *Iron boxes:* There are different kinds of iron boxes available in the market. Coal, electricity, steam, kerosene are utilised in the iron boxes. Automatic iron boxes are available. Mangle is an instrument used to press sarees and dhotis.

Before ironing, iron box should be checked for its proper hotness. When it is not in use, iron box should be kept aside with little amount of oil. The oil should be wiped out before its use. According to the nature of the garment, the heat in the iron box should be adjusted. Cotton clothes need more heat than silk and wool. Nylon clothes should not be ironed.

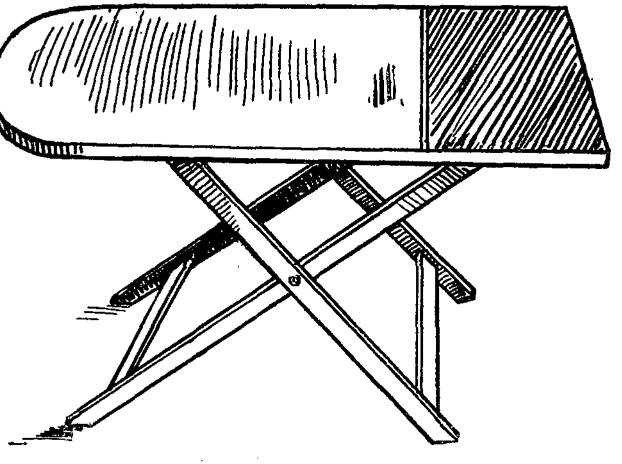


Fig. 19 Ironing Table

Ironing board should be strong and should not shake while ironing. Woollen blankets and other old clothes should be spread evenly on the ironing board. Iron box should be kept on an asbestos sheet or a ring on the right side.

Ironing procedure: Small parts of the garment should be ironed first. Flowered or embroidered garments should be ironed on the wrong side. Iron box should be held in the right hand and the garment should be smoothened with the left hand and ironed. Garment should be ironed starting from

the upper part of the right side. Ironing should be done on both the sides of the garment. Iron box, if left on the garment for a long time, that place will be burnt.

Soap or soap substitute, and water

Plenty of soft water and soap are required for washing. If the water is hard, the soapless detergents or synthetic detergents are used to get better results. They are safe for use on wool and silk. These are neutral soaps, hence could be used on any fabric without damaging them.

A Washing of cotton

Cotton is the most washable of all textile fabrics. It can be boiled for sterilization, ironed at high temperatures and bleached. It is also very absorbent.

(1) *Sorting:* Cotton articles are sorted accordingly as table linen, bed linen, personal garments and handkerchiefs.

(2) *Mending:* Mending in the form of patching or darning, should be done to the torn clothes before washing.

(3) *Stain removal:* Known stains should be removed using special stain-removers before the material is steeped.

(4) *Steeping:* Steeping is economical because it reduces the time, labour and soap. Here the loose and soluble dirt is removed by the pedesis action of the water particles. The starch from previous laundering is softened. The duration of steeping depends on the amount of dirt in the garment. Never steep longer in the same water, as bacterial action takes place, the water sours and fabric may be damaged. Warm water is used to shorten the time as well as to dissolve the dirt. Hot water should not be used as this hardens the protein matter and fixes the dirt.

(5) *Cleaning:* The most suitable method of cleaning will be governed by the type of fabric, type of article, the amount and kind of dirt present, its colour and number of articels to be cleaned.

Coarse materials can be washed in warm water using hard bar soap and by the application of hand friction or scrubbing with a scrubbing brush.

Strong white articles. such as table linen etc. are washed by applying light friction on a scrubbing board in warm water using Sunlight soap or any soap cake.

All coloured articles and fine materials are washed in lukewarm water. Application of light pressure or kneading and squeezing method is used. Soap jelly or soap solution or soap flakes are used as detergent. Heavy articles are washed in warm soapy water using suction washing method.

(6) *Rinsing*: Rinse in warm water to remove all soiled soapy water.

(7) *Boiling*: Boiling disinfects, whitens and freshens the cloth. Water used for boiling must be soft.

Ingredients —	Soda	— 1 tablespoon
	Soap shredding	— 1 tablespoon
	Water	— 1 gallon

Method: Dissolve soda and soap in half filled boiler. Heat and agitate the water to form a lather. Put the clothes into the boiler, bring to boil and boil for fifteen minutes. Over boiling causes yellowness in white clothes. In order to make the' water boil through the fabric, the boiler must not be packed too full.

(8) *Rinsing*: Rinse in hot water to remove the soap. The hot water keeps the soap in solution and ensures its complete removal from the fabric. A last rinse in cold water restores the whiteness; ring out the moisture.

(9) *Stiffening and blueing*: Both are done as one process. Prepare stiffening agent or starch solution.

Method: *Boiling-water starch*

1 tablespoonful starch

2 ,, ,, cold water

3 pint boiling water

Take starch in a basin. Add cold water. Mix to a smooth paste, using a wooden spoon. Add boiling water quickly, stirring all the time till the colour changes. Add equal volume of water to dilute the same. Wherever necessary the blue should be added to the starch to get the desired shade.

Rules for starching:

(*a*) The prepared stiffening and blueing agent should be stirred thoroughly before putting the articles, because the blue particles settle at the bottom and may cause patches on the article.

(*b*) Squeeze the material thoroughly to get complete immersion.

(*c*) Articles with lace, boarders and other crocheting should be treated carefully, as these do not require starching.

(10) *Wringing:* Wring the articles by hand or through wringer or mangle to remove as much moisture as possible.

(11) *Drying:* Outdoor drying is advisable as this helps to retain the whiteness and gives freshness to clothes. Articles should hang out on a line by the selvedge thread and clipped to the line with wooden clips.

(12) *Finishing:* Finishing is done by mangling or by ironing with a hot iron.

Coloured cotton: For coloured cotton, it is necessary to find out whether they are colour fast or not. If the colour is bleeding, it is wise to wash those items separately; methods are the same as mentioned earlier, except starching and blueing. Moreover coloured articles are dried in shade rather than in direct sunlight to retain their colour.

B. Washing of silk

Silk is suited to apparel because of its smoothness, soft lustre, high resiliency, toughness and adaptability to temperatures. Some types of silk are hand washable, but most retain their orginal appearance best when dry cleaned. For washing

mild soap should be used, strong alkalies diminish its lustre. White silk tends to become yellow with age or from unproper or too frequent laundering. Sunlight and cholorine bleaches damage silk. Silk requires a moderate temperature for ironing.

(1) Examine the items and do the necessary mending

(2) Remove if there are any spots or stains by suitable remover

(3) Prepare warm soapy water, using solution or soap flakes to make lather. For coloured silk use reetanut solution or soap nut solution. These solutions cleanse and also prevent bleeding of colour from the silk fabrics. Sufficient soap water should be used.

(4) Kneading and squeezing by hand is done for small garments and suction washing is adopted for large garments. Put extra soap solution through very soiled part.

(5) Rinse in warm water to remove soapy water. This is important; otherwise fine white powder will be formed on the surface.

(6) Use cold water with a little lime juice in it for the final rinse. This clears the colour, renews sheen and stiffens the silk.

(7) Iron the silk garments, when they are in damp condition. If thin silk needs stiffening, use a little gum solution in the rinse.

(8) Large articles of strong silk can be put through a rubber wringer.

(9) Thin silks can be wrapped in a cloth and rolled up for half an hour before being ironed.

(10) Drying should be done in a shady place as sunlight tenders silk and causes white silk to become yellow.

(11) Ironing, most silks are ironed when evenly damp. White silk is ironed on the right side to increase the natural sheen. Coloured silks are ironed on the wrong side. Moderate heat should be used for ironing. Garments should be aired after ironing and then folded.

C. Washing of wool

Woollen fabrics shrink and felt when subjected to heat and moisture. They must be handled very carefully if laundered at home. Bleeding of colour and stretching out of shape are the other dangers that should be avoided in washing. Bleeding is caused by strong alkaline soap and also by drying slowly. Soaking, rubbing, sudden temperature change and perspiration are the causes for matting. Stretching out of shape is caused by lifting the garment up out of the water or by hanging it up.

For successful washing of woollen fabrics the steps to be followed are:

(1) All non-washable trimmings should be removed.

(2) Mend where necessary to prevent enlargement of the hole.

(3) Trace an outline of the woollen sweater on a piece of clean paper. Fine woollen knitwear are liable to stretch out of shape. Hence the garment after washing can be placed on this outline and dried flat on the paper to retain the shape.

(4) Make good suds of neutral soap or syndet, in luke warm water 90° to 100° F.

(5) If the water is not soft, add liquid ammonia to white woollen garments and Borax water for coloured woollen garments use non-alkaline soaps for washing woollen.

(6) Do not soak, but quickly squeeze the suds through with a cupping motion. Cleanse by kneading and squeezing, keeping the garment under water as far as possible. Avoid rub or twist, squeeze out water and use second sud if necessary. Do not use much friction.

(7) Rinse several times in luke warm water. Sudden change in temperature will cause matting. Lift by supporting the sweater with hands and squeeze out by pressing it between hands, only soft water must be used.

(8) Place on a dry bath towel, roll up and pat to remove excess water, then unroll at once.

(9) Place the sweater on the outline made in the beginning, stretch and pin in place. Dry flat on a charpoy.

(10) Quick drying is essential. Hence dry in an airy place or before an electric fan but not in the sun.

(11) When almost dry, remove pins, and press lightly to remove pin marks.

Exercise

1. Give the general rules for washing.
2. List the steps used in washing cotton garments.
3. Describe the method of washing a silk blouse.
4. How will you wash a woollen sweater?

4. DRAFTING AND STITCHING CLOTHES FOR CHILDREN

A pattern is made in one of the three ways, namely drafting, draping fabric on a dress or by flat pattern designing. Drafting is a system of drawing patterns with mechanical precision based on body measurements. In drafting success depends on the pattern maker's ability to take accurate body measurements. It is an accurate method and is also easy to follow.

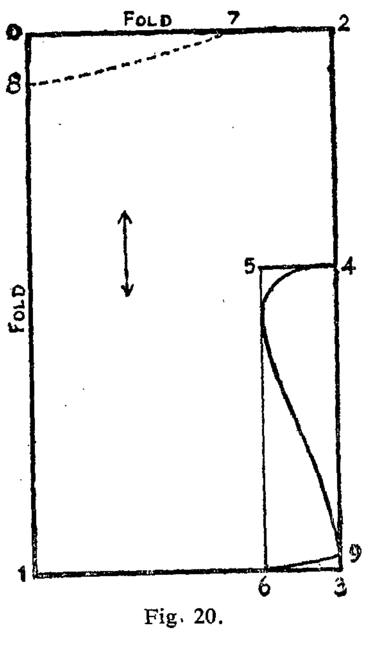


Fig. 20.

1. Jabala

Measurements:

Full length — 34 cms.

Chest round — 46 cms.

Components:

Main part,

Cross pieces,

Tape.

Constructions:

0—1 = Full length + $2\frac{1}{2}$ cms.

2—3 = Full length + $2\frac{1}{2}$ cms.

0—2 }
1—3 } — $\frac{1}{4}$ Chest round + $2\frac{1}{2}$ cms.

3—6 = $2\frac{1}{2}$ cms.

0—7 = $\frac{1}{4}$ Chest + $1\frac{1}{2}$ cms.

0—8 = $2\frac{1}{2}$ cms.

Give shape to 8 and 7 and join 4, 5, 6, 3.

Method of stitching :

First fold the sleeve of Jabala and hem it. Then put running stitches in the neck part and shorten it. After that help the Cross piece in the neck part and stitch it. Open the back part and deep the false in the left side and the extended piece in the right side and join the sides. After that fold the bottom part and stich it.

2. Yoke Frock

Measurements :

Full length	— 41 cms.
Chest round	— 46 cms.
Shoulder width	— 22 cms.
Sleeve length	— 10 cms.
Round arm	— 15 cms.
Neck round	— 26 cms.

Suitable materials :

Silk and 2 × 2.

Components :

Front part	— 1 (on fold)
Back part	— 2
Skirt part	— 1 (on fold)

Sleeves — 2

Collar — 3

Construction: *(Front part)*

0— 1 = $\frac{1}{4}$ Chest round — 3 cms.

0— 2 = $\frac{1}{2}$ shoulder width + $\frac{1}{2}$ cm.

1— 3 = $\frac{1}{4}$ chest + 3 cms.

0— 5 = $\frac{1}{12}$ chest.

0— 6 = $\frac{1}{12}$ chest + 1 cm.

Shape the front neck from 5 to 6.

2— 7 = 1$\frac{1}{2}$ c.m.

Join 5 and 7.

Draw an armhole shape from 3 to 7.

Back part:

8—10 = $\frac{1}{4}$ chest — 3 cms.

8—13 = $\frac{1}{12}$ chest.

8—12 = 3 cms,

0— 5 = 2 cms.

Shape 4 to 5.

Puff sleeve:

0— 1 = sleeve length + 1$\frac{1}{2}$ cms.

0— 2 = $\frac{1}{4}$ chest round + 5 cms.

2— 4 = $\frac{1}{12}$ chest round + $\frac{1}{2}$ cm.

3— 5 = 1 cm.

5— 6 = $\frac{1}{2}$ cm.

YOKE FROCK

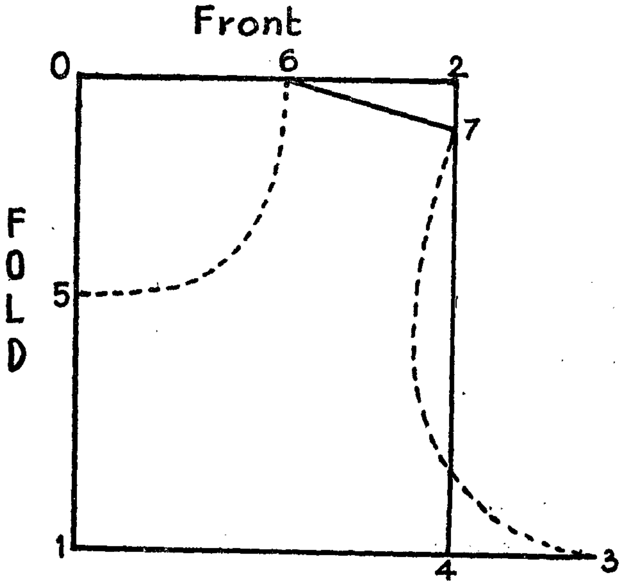


Fig. 21.

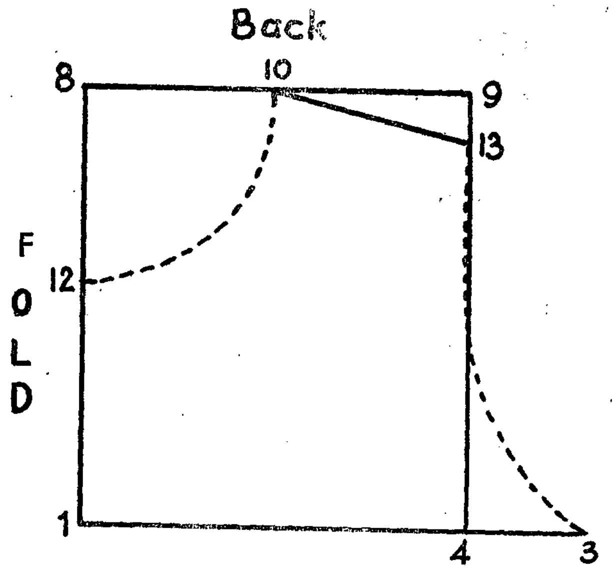


Fig. 22.

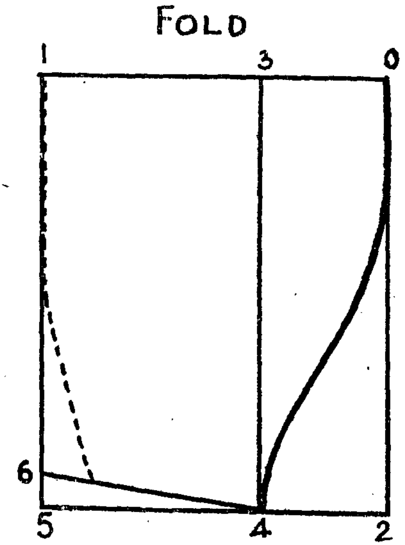


Fig. 23.

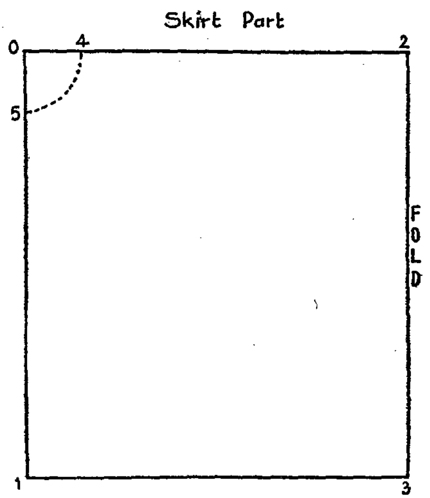


Fig. 24.

Stitching method :

Draw the design in a paper for the required measurement. Take the cut-out and have it drawn on the cloth and cut it.

First stitch the shoulder and side seam in the body part. Stitch the false and extended in the back side. Have a collar in the neck. Stitch the skirt part with long stitch. Have pleats or gathering for the waist for the given measurement. Join the body part and skirt part. Join the sleeves with the armpit.

Stitching method of puff sleeves :

First cut the sleeves for the given measurement. Fold the bottom and stitch it. Have gatherings in the sleeves for the given measurement and join it with the armpit part.

3. Blouse

Measurements :

Full length	—	40 cms.
Chest round	—	66 cms.
Natural waist length	—	26 cms.
Shoulder width	—	13 cms.
Sleeve length	—	16 cms.
Round arm	—	22 cms.

Components :

Back part — 2

Front part — 1 (Fold)

Sleeves — 2

Cross pieces.

Constructions : *(Back Part)*

0— 1 = Full length + $1\frac{1}{2}$ cms.

1— 2 = 3 cms. (turnings)

0 – 3 = $\frac{1}{4}$ chest — 3 cms.

0— 4 = $\frac{1}{2}$ shoulder width + $\frac{1}{2}$ cm.

3— 6 = $\frac{1}{4}$ chest + 3 cms

0— 7 = Natural waist length + $\frac{1}{2}$ cm.

4—12 = $1\frac{1}{2}$ cms.

0—13 = $\frac{1}{12}$ chest.

Join 13 and 12

0— 14 = 3 cms.

Draw a back neck shape from 13 to 14 and

draw a back armhole shape from 12 x to 6

16 is a mid-point of 7 — 9.

Shape the back part from 6, 9 to 11.

8— 9 = $1\frac{1}{2}$ cms.

16—17, 16—18 = 7 cms.

16—19, 16—20 = 1 cm.

make a dart from 16.

Front part:

14—15 = 2 cms.

Draw a front neck shape from 14 to 13.
x—y = $1\frac{1}{2}$ cms.

Draw a front armhole shape from 12, y to 6.
2—21 = $1\frac{1}{2}$ cms.

Shape the front part from 11 to 21.

Sleeve:

0— 1 = Sleeve length + 1 cm.

0— 4 = $\frac{1}{4}$ chest round—3 cms.

1— 2 = 3 cms. (turnings)

0— 3 = 4—8

Join 5, 7, 6

y in a mid-point of 0—5

y—x = $1\frac{1}{2}$ cms.

Draw a sleeve shape from 0, 5, 7, 6 to 8.

7—8 = 1 cm.

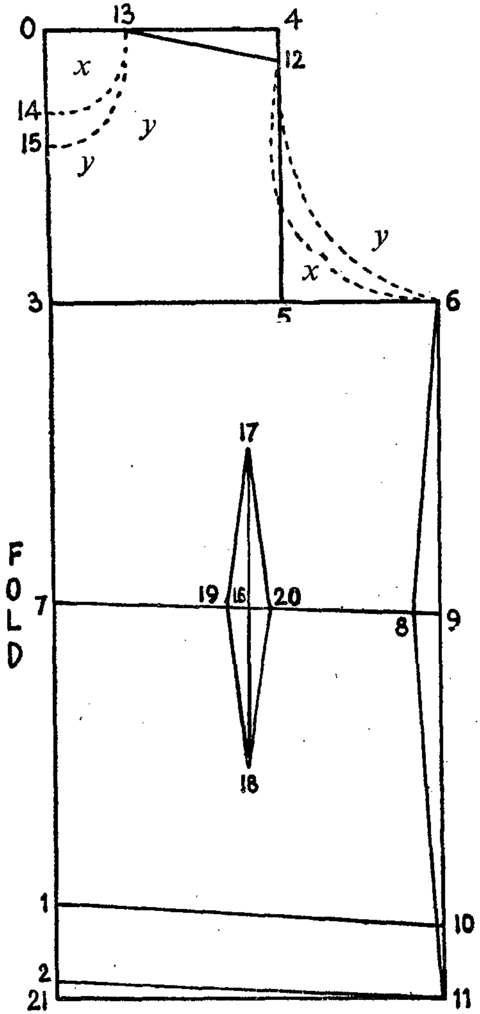


Fig. 25

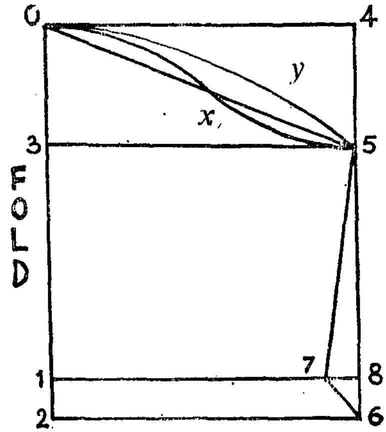


Fig. 26

Stitching Procedure :

Measure the length and width of the cloth. See whether there is any defect in the cloth. Draw the design for the required measurement in the paper and take the cut-out. Draw the same design in the wrong side of the cloth leaving space for fold seams etc. Cut the sleeves first. Keep the front and back side together and stitch in the wrongside. Stitch the false and extended opening in the backside. Fold the bottom and hem it. Stitch the neck side giving a piping or cross piece. Have hooks for the open.

Exercise

1. Visit the nearby ready-made shops and compare the cost of home-made and ready-made garments.

5. MENDING

Mending is the art of repairing any article of wearing apparel or of house or bed-linen, by means of patching or darning. It is a very necessary branch of needle work. The ability to mend neatly and tidily is invaluable and it is also a means of

saving, as the articles in use are made to last longer than otherwise would.

The most satisfactory methods of mending torn or worn out garments are patching and darning.

Patching

Patching is a type of mending where in the place of a tear or hole, an additional piece of fabric of the same kind is inserted and stitched. For repairing a big hole. patching is more suitable than darning. It is stronger and can stand more wear and tear in laundering.

In order to make the work inconspicuous, the patch should be of the same material as the garment and its grain should match the grain of the garment. In a printed fabric, the patch should be cut so as to match the design also perfectly. If the garment is faded, cut the material for patching from some hidden part in the garment itself (that part can be repatched with a different material). If new material is to be used, wash it with soap and dry in the sun until it is faded to the correct shade.

Plain patch

First of all trim the edges of the hole or tear to form a square or rectangle. Make diagonal cuts at the corners about ¼ inch deep and turn under the raw edges to the wrong side of the fabric. Cut a patch that is about one inch longer on all four sides and place it under the hole with its right side facing the wrong side of the garment. Pin the patch piece in position. Tack the folded edge of the hole to the patch and hem round with small stitches. putting a diagonal stitch into each corner and turn the work to the wrong side. (Fold under the raw edges of the patch about 3/8" and tack in place. Hem carefully so that the stitches will not be very visible on the right side.

Print Patch

This patch is used on printed fabrics. First of all trim edges of the hole in rectangular shape. Then cut the patch

sufficiently large, turn in the edges and place it over hole with its wrong side facing the right side of the garment. Take care to match pattern and grain perfectly. Tack and hem around the four sides. Turn the work to the worng side and trim the raw edges of the patch and the hole to within 3/8" of the hemming. Now blanket stitch the raw edges without catching the garment.

Flannel Patch

Done on woolen and flannel materials. This patch is done similar to plain patch. But there will not be any foldings in this and instead of hemming, herring bone stitch is used here to finish the patch as well as to neaten the raw edges.

Darning

Darning is that method by which new threads are supplied in the place of thin or worn out woven ones. It is a form of hand weaving or an imitation of the process adopted in the manufacture of fabrics.

Rules for darning

(1) Prevent a hole from fraying by strengthening a thin place.

(2) Begin at the left hand side-it is easier to see any pattern that has to be repeated in the darn—the hand does not cover up the darn while it is in progress-the hand does not rub over the mending.

(3) Darn should be an irregular shape so that the stain of new threads is not brone by the same line of threads as to give rise to fresh weaknesses. Octagonal shape is the most practical.

(4) Loops 1/10th should be left to allow for shrinking. The ends of the threads are left hanging 1/4" and not fastened off, the threads of the darn being so woven in as to make the fastening unnecessary.

(5) Thread used should be as like the original as possible in colour, texture and standing. The general rule is silk on silk. woolon wool and cotton on cotton.

(6) The darn must in no way strain the material or cause puckering. The work must be kept flat by keeping the thumb on the thread as it is pulled through the material.

Exercise

1. Bring materials and learn different methods of mending the garments.

Reference Books

1. Doongaji, S. & Deshpande, R. 'Basic processes and clothing construction', New Raj Book depot I, Bengali mal market, New Delhi.

2. Savitri Pandi 'A manual of children's clothing', Orient Longmans Limited, Madras.

3. Kanthimathi Kumar 'Clothing for the Home' Directorate of Extension, Ministry of Food and Agriculture, Government of India, New Delhi.

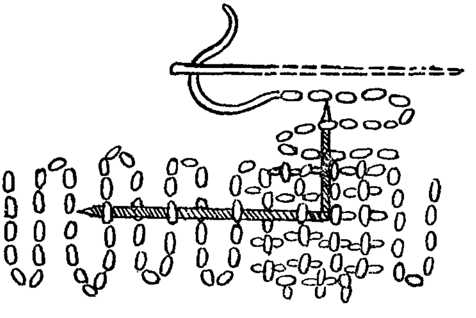


Fig. 27.
Darning irregular torn

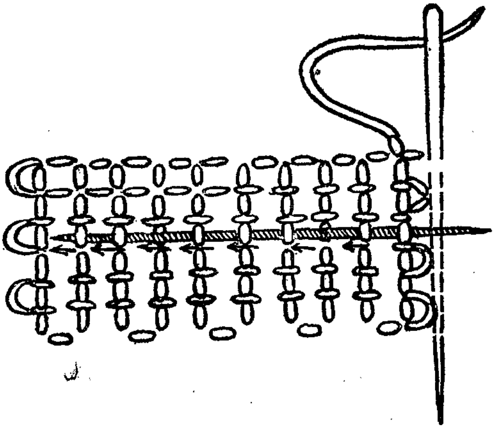


Fig. 28.
Darning straight torn

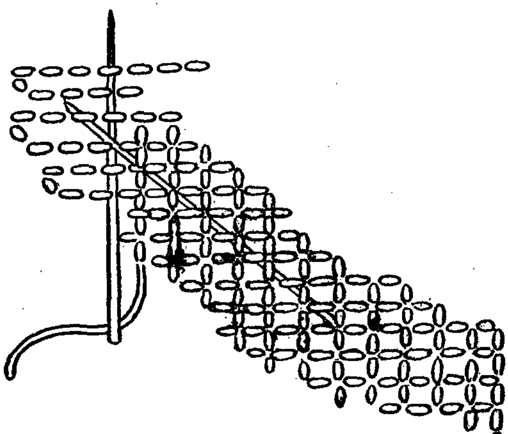


FIG. 29.
Darning diagonal torn

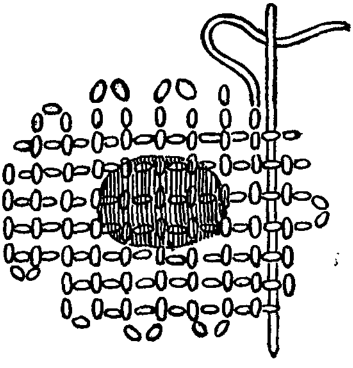


FIG. 30.
Darning holes

MEASURES—CONVERSION TABLE

Length :

1 inch	=	2.5 cm.
1 metre	=	39.37 inches

Weight :

1 oz.	=	28.4 grams
1 lb.	=	453.6 grams
1 kg.	=	2.2 lb.

Liquid measure :

1 pint	=	0.57 litre
1 gallon	=	4.546 litre
1 litre	=	0.22 gallon or 1.76 pint

Land area :

1 ground or 2,400 sq. ft.	≐	2.23 are
1 are	=	1076.39 sq. ft.
1 sq. metre	=	10.764 sq. ft.

Volume :

1 cubic foot	=	0.028 cubic metre
1 cubic metre	=	35.315 cubic ft.

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